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PRIMARY SERIES

Spick and Span

The Health Parade

"

MIDDLE-AND-UPPER-GRADE SERIES

Growing Big and Strong

Safety Every Day

Doing Your Best for Health

Building Good Health

Helping the Body in Its Work

The Healthy Home and Community

"

DOING YOUR BEST FOR HEALTH

BY

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CONTENTS

To the Readers of This Book, vii

Unit I · Ups and Downs of Cleanliness

Cleanliness in Greece and Rome, 4
When Cleanliness Was Neglected, 13
How Cleanliness Helps to Prevent Disease, 16

Unit II · How Cleanliness Helps Us to Make the Most of Ourselves

Helping the Skin to Do Its Work, 34
Hair and Fingernails, 41

Unit III · Helping the Body to Make the Best Use of Food

The Six Food Groups, 58
Planning Meals, 68
How Food Is Made Ready for Use in the Body, 72
Getting Rid of Body Wastes, 75
Helping the Digestive System to Do Good Work, 78

Unit IV · The Eyes

How the Eyes Take Pictures, 90
Making the Most of Your Eyes, 96
Overcoming Eye Faults, 100
Protecting the Eyes from Harm, 105

Unit V · The Ears

Sound Waves, 119
Making the Most of Your Ears, 124
Guarding the Ears from Outside Injury, 132

122603

Unit VI · Guarding the Nose

The Nose Route, 142
What Happens to Air in the Lungs, 144
All about Colds, 145

Unit VII · Making the Most of Bones and Muscles

How Bones Are Put Together, 164
How Bones and Muscles Work Together, 166
Showing Good Form, 171
Making the Most of Your Feet, 174
Why the Muscles Need Exercise, 178

Unit VIII · Making the Most of Clothes and Shoes

Clothes to Keep Us Warm, 189
Clothes to Keep Us Cool, 193
A Change of Air for the Skin, 197
Choosing Clothes, 199
Shoeing the Feet, 202
Taking Care of Your Clothes and Shoes, 209

Unit IX · On the Lookout

Safety on Street and Highway, 218
Safety in Play, 222
Fire, 227
Water, 228
A Safe and Happy Vacation, 229
In the Woods and Fields, 237

BOOKS TO READ, 247

HEALTH WORDS, 249

INDEX, 259

TO THE READERS OF THIS BOOK

There was once an old woman who made the funniest and the best gingerbread boys you can possibly imagine. They had currants for eyes and red gumdrops for noses. They looked so funny that the old woman used to cackle with laughter. Then all the children within sound of her laugh came running to her house.

The old woman was very poor. One day a friend said to her: "Why don't you make gingerbread boys and sell them in the grocery stores? I'm sure you would make a lot of money." The old woman thought it might be a good idea to try it. She baked a big batch of gingerbread boys and put a dozen in each one of several brown paper bags. "Why should I spend money for fancy boxes?" she said. "It's what people find in packages that counts."

The old woman took her bags around to the storekeepers. She gave each of them a gingerbread boy to eat. The spicy taste of the gingerbread made the storekeepers think of their boyhood days. They said they would be glad to put the gingerbread boys on their shelves for people to buy.

The brown paper bags looked queer among all the pretty boxes of cookies and crackers on the shelves. There were boxes made to look like Noah's ark, filled with animal crackers. There were boxes covered with pictures of the cookies to be found inside. There were blue boxes and pink boxes and yellow boxes covered with shiny transparent paper. The people who came to buy crackers and cookies chose the ones that came in the pretty boxes. So few people bought the gingerbread boys that the old woman asked one of the storekeepers to tell her why. The storekeeper told her that so many people nowadays have cookies and crackers to sell that the ones who put up their goods in the best-looking packages are the ones who sell the most. Then the old woman bought some pretty red boxes. She wrapped the gingerbread boys in transparent paper and tied one on the outside of each box. Soon the old woman could not make gingerbread boys fast enough to fill all the orders she received.

Do you think that it is only what is inside a package that counts? Which packages do you open first at Christmas or on your birthday—the exciting-looking, knobby packages or the flat plain packages? Would you rather ride in an automobile of the latest model or in an automobile built five or six years ago? If you had a choice, which would you take, a big red apple or a little yellow apple?

Beautiful stories may be printed in a dull-looking book. A little yellow apple may be far sweeter than a big red one. An automobile built five years ago may run better than an automobile built yesterday. A flat plain package may hold a much more expensive present than the large knobby one. But you may not know these things. Before opening a package or reading a book or choosing a piece of fruit the only way you may have to judge it is by its looks.

People, as well as goods to be sold, are wrapped up in packages. Everything that shows on the outside is your wrapper. You cannot change the shape of your nose or the color of your eyes; but if you have a healthy body to begin with, you can make it strong and straight. You can have a clean rosy skin and white-tipped fingernails and the shining glossy hair that people like to look at. You can have clean tidy clothes and well-shined shoes. You can teach your hands to be quiet when they are not working for you. You can have the pleasant voice that people like to hear. You can have a quick charming smile and merry dancing eyes. You can show kindness and cheerfulness and eagerness to help other people. You can make the most of the body and the mind with which you were born.

Have you ever heard it said of anyone, "He is putting his best foot forward"? This is a way of saying that a person is meeting the world with the best of himself instead of the half-best or the worst. Are you trying always to put your best foot forward? In this book you will learn about many ways in which you may make the most of yourself.

DOING YOUR BEST FOR HEALTH

UNIT I

Ups and Downs of Cleanliness

Why do you like to be clean? Do you think that clean people are more pleasing to look at than dirty people? Do you like the feeling of a clean body and clean clothes? Do you have more respect for yourself when you are clean? In this unit you will learn of other boys and girls who liked to be clean for the same reasons that you do. They knew that being clean was one of the ways in which they could make the most of themselves. But these boys and girls did not know everything that you know about how important it is to be clean. Only three generations of boys and girls since the world began have known about one of the main reasons for being clean. Your grandmother and grandfather probably learned it when they were young. Your father and mother have known it all their lives.

DO YOU KNOW

What this reason is?

How a Greek boy took a bath?

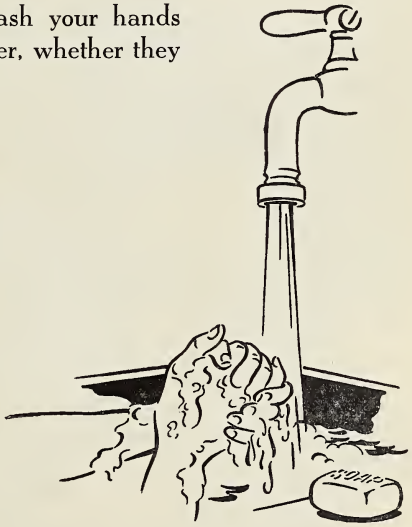
How a Roman boy took a bath?

What Benjamin Franklin said about cleanliness?

How the boys and girls who first came to America took baths?

What you can do to help to keep your home and your school and your community clean and tidy?

Why you should wash your hands with soap and water, whether they look dirty or not?



One day, more than two thousand years ago, a teacher and his pupils were talking together, just as you talk with your teacher in class. The teacher, whose name was Plato, was talking about goodness and beauty. He asked his pupils this question: "To him who has an eye to see is there any lovelier sight than a person in whom a beautiful soul is united with a beautiful body?" And one of his pupils answered him, saying, "There can be none so lovely."

Plato and his pupils lived in a country called Greece. Is there a map in your geography book that shows this country? Look at it closely. How big is it compared with other countries? The people who lived in the little country of Greece loved beauty. By beauty they meant what we mean when we speak of making the most of ourselves. It was not necessary to have a beautiful face and form. Not many people are born with perfect features and perfectly shaped bodies. But the people of Greece thought that the bodies of boys and girls could be trained to be healthy and strong and straight. They thought that the minds of boys and girls could be trained to love the true and hate the false, to seek knowledge, to show courage, and to be gentle and kind. Is not this what we mean by making the most of ourselves?

Schoolboys of Athens

When a Greek boy who lived in the city of Athens was eight years old, he usually went to school. His sisters

"

Like the Greeks of old, we today realize
the value of music in education

From *All the Children*

stayed at home and learned from their mother how to keep house. The boys were taught how to take care of their bodies as part of their school work. They learned to care for the skin by bathing every day. They learned to wash their hair often and to keep their clothes clean. Schoolboys exercised every day on a playground outside the city. A teacher taught them how to play handball and to run races and to swim. The boys played games naked, so that every day their bodies had a sun bath. Before starting to play they were rubbed with oil. When the games were over, the oil and sweat were scraped from the skin with a scraper which looked very much like a curved paper-cutter. Then the boys went to a gymnasium near their playground for a bath.

There were no bathtubs or shower baths in the gymnasium or in their own homes. The Greek "bathtub" was a big bowl, which was supported on a column three feet high. A boy or girl took a bath by dipping water from the bowl and pouring it over the body. The waste water was carried off by a trough cut in the stone on which the bather stood. Soap was unknown. Olive oil was used instead.

Schoolboys were also taught music. This was supposed to give them good and happy thoughts and to fit them for good society. Do you know any boys and girls who can play the piano or some other musical instrument? Perhaps you yourself are taking piano or violin lessons. Do you have a school band? Do you study singing in school? Do you agree with the Greeks that music makes people have pleasant thoughts and fits them for society? Is a boy or girl who can play a musical instrument popular at parties?

Learning to play a musical instrument was part of a Greek boy's education

Greek boys learned also to read and write. They did not have pencils and paper or desks, as you do today. A boy learned to write by making the letters with a sharp-pointed stick on a tablet coated with wax.

When a boy had learned to read and to write, his school-teacher had him learn long poems telling about the history of his country. Do you study the history of your country today? In studying history the boys of Athens grew to love their city. To be a good citizen was their highest ideal. Do you also learn in school to be a good citizen?

A Nation with the Bath Habit

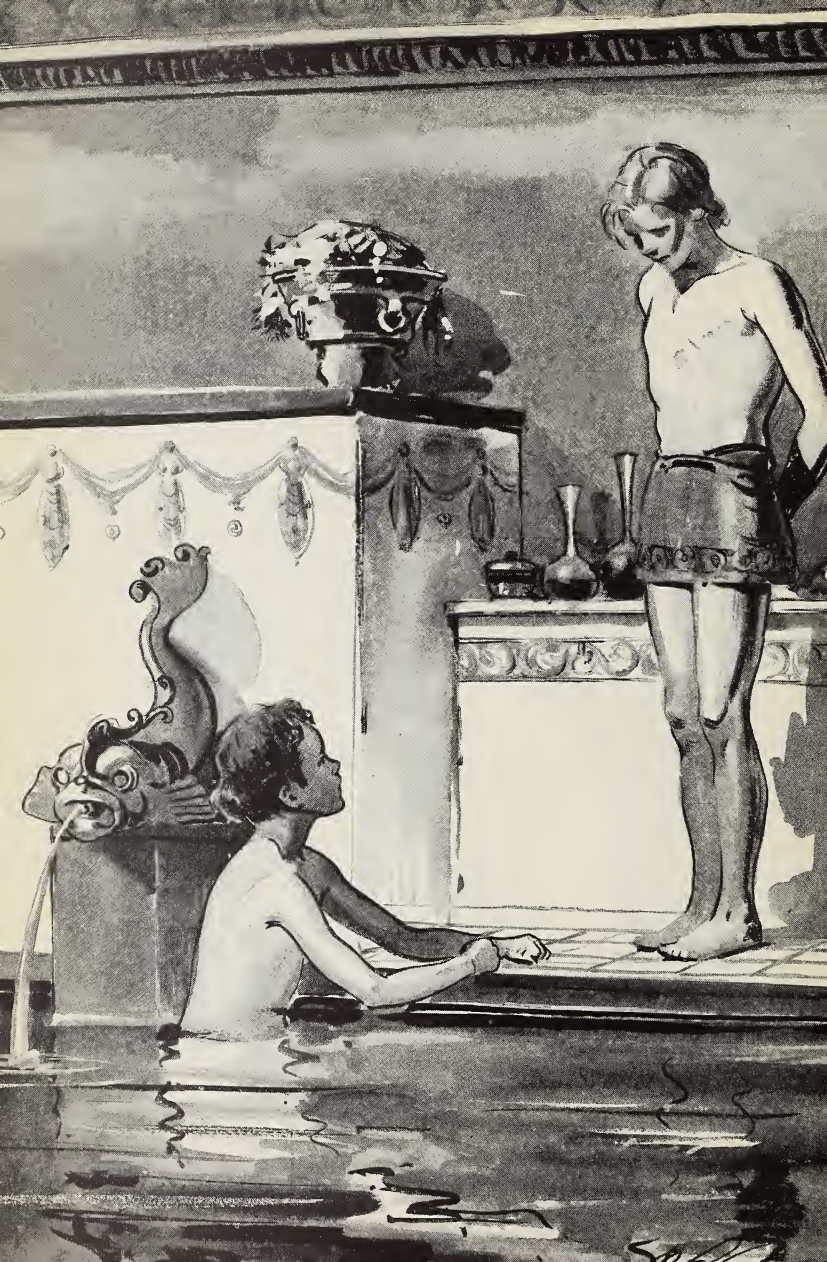
The people of Greece were at last conquered by the Romans. Find the country of Italy in your geography book. Does it look something like a long boot? There was a time in the history of the world when the people who lived in the city of Rome, near the foot of the boot, were masters of all the world they knew. If you place the point of a compass on the toe of Italy and draw a circle big enough to take in England, you will have an idea of about how much land was ruled by Rome.

The Romans were the greatest bathers the world has ever known. Buildings as splendid as the palaces of kings were built in the city of Rome, where rich and poor alike could enjoy all the pleasures of the bath. The Romans also built public bathhouses in almost every town over which they ruled.

Water was brought to the city of Rome by fourteen great aqueducts. The

If you ever visit Italy, you may see aqueduct bridges like this one on which water was carried across the valleys two thousand years ago

Photograph by Burton Holmes from Galloway



word *aqueduct* comes from two words in the Latin language. You may study Latin when you are in high school. Many English words come from the Latin language, which was spoken by the Romans, and from the Greek language, which was spoken by the Greeks. The two Latin words from which our English word *aqueduct* comes are *aqua*, which means "water," and *ducere*, which means "to lead." An aqueduct, usually built of stone or concrete, leads water into a city or town from a body of water many miles away. Do you live in a city? Does an aqueduct lead water to your city from a place far away?

There were so many bathhouses in Rome that it was necessary for the aqueducts to bring in millions of gallons of water a day. A Roman bathhouse was like a complete little city, with the rest of Rome shut out. There were baths for men and boys and for women and girls. Rich people who had bathrooms in their own homes went to the public baths to meet their friends, to talk over the news of the day, and to play games or read or rest.

This is how a Roman boy named Marius took his daily bath. When he reached the bathhouse, he gave the keeper of the baths a coin worth about one quarter of a cent in our money. This money was to pay for his bath. Marius then went to the handball courts, where he played a game of handball with his friend Lucius. When the two boys were pleasantly tired, they went to a dressing room, where they took off their clothes.

Then the two boys entered the warm room of the baths. The air was warm and sweet with perfume. Beautiful pictures made by piecing tiny colored stones together decorated the walls. The room was

" Marius and Lucius took a cold plunge after their warm bath

filled with men and boys sitting on stone benches or walking about. The warm room was a place to rest body and mind before taking a bath.

From the warm room the boys went to the hot room. Here Marius and Lucius sat until the sweat poured from their bodies. One of the bath slaves scraped off the sweat. Each boy had his own scraper. Marius had a scraper made of bone with a silver handle. He carried it on a large ring. Also hanging from the ring were a little pot containing oil and a flat pan to be used for drinking water.

After sweating, the boys ran to the other end of the hot room, where a tank of warm water was sunk in the floor. Slaves scattered perfumes over the water. The boys plunged into the warm water and splashed about. Then they jumped out and were sprayed with cool water by one of the slaves.

From the hot room the boys went to the cold room. Here they took a cold plunge in a tank sunk in the floor. Then wrapping themselves in bathrobes, the boys went to a room called the anointing room. *Anoint* means "to rub with oil." Each boy lay down on a stone table and was rubbed with sweet-smelling oil from his own pot of oil.

Nowadays a warm soap-and-water tub bath or sponge bath or shower bath can make you even cleaner than the Roman boys and girls were made in their sweet-smelling swimming pools. How often do you take an all-over bath and put on fresh underclothes? Everyone should have at least two soap-and-water baths every week in order to look and to feel clean.

At last Rome also was conquered, and hundreds of years went by before most people again found it easy to take a bath. The rich people in the castles, who had servants to carry water, were able to bathe and to wash their hands before meals and to have clean clothes, but the poor people who lived in little huts about the castles were never clean. They had all they could do to scrape enough food together to put in the one dish from which they all ate.

"

Young Benjamin Franklin arrived in the city of Philadelphia with only a few pennies in his pocket. (From a painting by Charles E. Mills)

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Making soft soap in the pioneer days of our country

"

It was unheard of to clean the streets in the towns. Even the rich people who lived in the great houses threw all the refuse out of the windows into the street or emptied it at the door. Flies swarmed everywhere. Children played in the mud. Diseases spread like fire in a forest of dry trees, but no one connected disease with uncleanliness.

Cleanliness in Pioneer Days

About two hundred years ago a young man who lived in the city of Philadelphia wrote down one evening all the things he must do to make the most of himself. Not many years before, when he was a young boy, he had come to

the city with only a few pennies in his pocket. Now he had a job as a printer, but he was very anxious to get ahead and to make something of himself. He made a list of thirteen things he must do to be a success. One of the things he wrote was this: "Tolerate no uncleanliness in body, clothes, or habitation." This meant that he would never allow himself to have an unclean body or unclean clothes or an unclean home.

The young man's name was Benjamin Franklin. Have you learned about some of the things he did for his city and his country? Do you think that Franklin made the most of himself?

In the early days of our country it was hard for people always to be clean. Even in old England all the water used by a family had to be carried into the home and heated in pots hanging in the fireplace. The boys and girls in pioneer days often had to break the ice in a spring or brook in the wintertime before they could even get water to wash their hands and faces. Their soap was made in early spring of wood ashes and grease saved from cooking. This soap was called soft soap because it did not harden in the making, as does the soap we use today. It was so strong that it hurt the skin. The boys and girls of pioneer days used soft soap when they took their Saturday-night baths in a wooden tub by the fireplace. No wonder they did not like to take baths when they had to carry in all the water to fill the washtub and all the wood to heat the water, and had to use strong, bad-smelling soap.

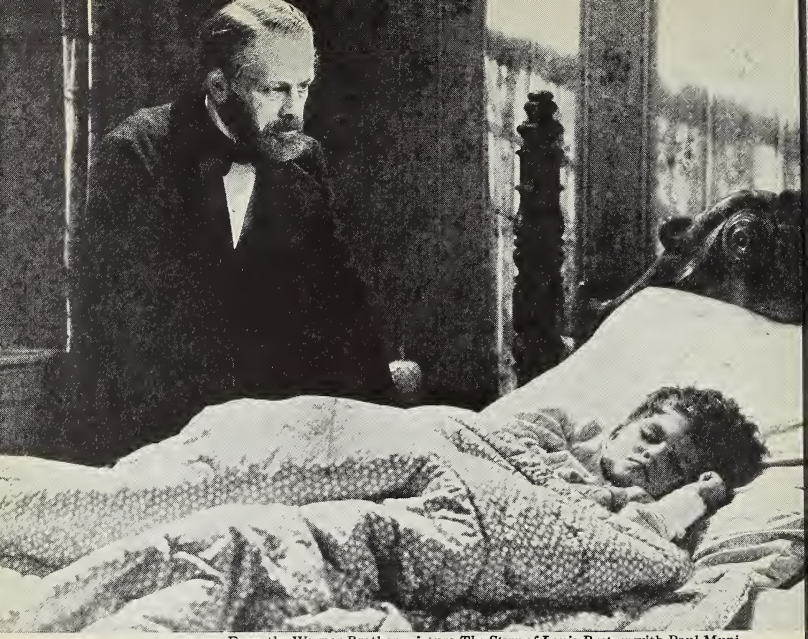
HOW CLEANLINESS HELPS TO PREVENT DISEASE

In the eighteenth and early nineteenth centuries people used to think it was dangerous to take too many baths. They thought it made the body weak. But in the nineteenth century science came to the rescue of cleanliness. Do you study science in school? Do you learn about plants and animals and stars and other beautiful and interesting things? The study of things in the world about you and the study of your own body are sciences. The study of how to cure and to prevent disease is called medical science. After the middle of the nineteenth century it was proved that cleanliness is one of the ways of keeping certain diseases from spreading. Then people began to realize the importance of keeping clean.

The principal thing that people used to connect with dirt was bad smells. Some doctors noticed that people who lived crowded together in dirty evil-smelling houses and streets were sick more often than people who lived in clean airy places. For this reason they thought that bad smells and disease went together.

If you had lived in this country before the middle of the nineteenth century, probably your mother would have given you a rag soaked in vinegar or a bag filled with a sharp-smelling medicine in order to drive away harmful smells when a dangerous disease was spreading among the children in your neighborhood. To us who today know the causes of many diseases, such ideas seem very strange.

What is this pioneer mother telling her son about the bag of sharp-smelling medicine she has hung about his neck?



From the Warner Brothers picture *The Story of Louis Pasteur* with Paul Muni

Louis Pasteur at the bedside of a boy
whose life was saved by one of his discoveries

A Great Health Hero

During the last half of the nineteenth century a good and wise man at last discovered the true reason why certain sicknesses spread from one person to another. The name of this man was Louis Pasteur. He lived in France. His father had been a soldier under Napoleon. When Louis was a little boy, his father told him many stories about the greatness of France. At night, over his lessons, Louis dreamed of doing something for the country he had learned to love so well.

Not long ago the people of France were asked to vote on the question "Who is the greatest hero of France?" France is a very old country. To vote on this question the people of France had to think back more than fourteen hundred years. How long should you have to think back if you were asked to name the greatest hero of your country? Can you guess the name of the person whom the French people chose as the greatest hero who had ever lived in France? He was not a great warrior. He was not a great king. He was not a great saint. He was a poor soldier's son who, when he was a little boy, had dreamed of doing something for his country. The people of France chose Louis Pasteur as the greatest hero of France. Pasteur is a hero of health. It is said that he and his pupils and his followers have saved more lives than all the lives that have been lost on the battlefields of France.

Pasteur won greatness because he proved that there are tiny forms of life which may cause sickness and even death when they are carried into the bodies of men, women, children, and animals. The most common name for these tiny forms of life is *germs*. Diseases caused by germs are called communicable diseases, that is, dis-

How are these boys helping to keep harmful germs out of their bodies?

Steven A. Coons

Helping to make home
a clean and pleasant place

eases that are catching. We cannot see germs. They can be seen only by looking at them through a microscope. Many germs are harmless. Some of them are so useful that we cannot live without their help. Do you like bread? A tiny germ called yeast is used in making bread. Another kind turns cider and the juice of grapes into vinegar. Tiny germ plants in the soil help to prepare food for the plants that human beings and animals use as food.

Keeping Germs out of Our Bodies

Harmful germs cannot hurt you unless they get inside your body. Cleanliness helps you to keep them out. One of the ways in which you can help to keep harmful germs out of your body is by scrubbing your hands with soap and warm water before eating, whether they look dirty or not. Clean hands are less likely to have harmful germs on them than hands that have not just been washed. Can you think of all the food you carried to your mouth with your fingers at your last meal? Harmful germs may be rubbed from the fingers to a piece of bread or to a cookie or to

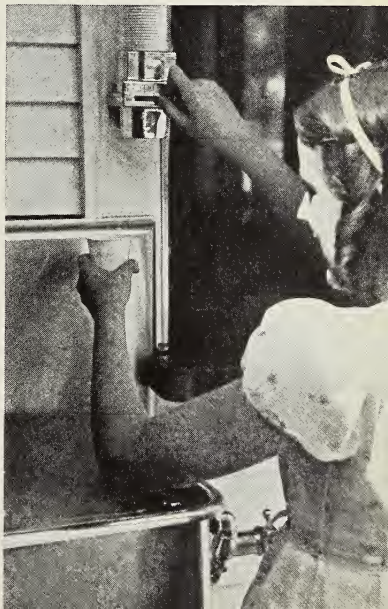
any other food you carry to your mouth with your fingers. Washing with soap and water helps to flush harmful germs from the hands.

You use forks and spoons to carry to your mouth most of the food you eat. Are you careful never to put into your mouth a spoon or fork which someone else has just used? Germs may be carried from one person's mouth to another person's mouth by forks and spoons which are not clean. Dishes and silver should always be washed, after use, in hot soapy water and rinsed with boiling water. They should always be dried with a clean towel or with hot air.

You drink water and milk from a cup or glass. The milk bottles that the milkman brings to your doorstep hold pure milk. The men who milk the cows and the men who get the milk ready for market are very careful to keep it clean and free from harmful germs. Great care is taken to guard the purity of the water which comes into your home. Are you careful to drink your clean milk and water from clean cups and glasses?

Do you ever help with the dishwashing at home? Do you take great pride in shining all your glass and china and silver with a clean dish towel? Hot soapsuds and a hot rinse also help to make dishes shine.

Steven A. Coons



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Clean water from a clean cup

Galloway

Street-sweepers in Ceylon

Clean Homes

Most harmful germs cannot live without moisture. Air and sunlight dry up germs, and they die. By keeping our homes, our schools, and our neighborhoods free of dirt and rubbish, we take away the covers which hide harmful germs from the air and sunlight that dry them up. Does it make you proud to have a clean tidy home? People like to live in clean, airy, pleasant rooms.

Many boys and girls help their mothers to keep house. They brush dirt from their shoes before they enter the home. They hang up their hats and coats, and put their rubbers in the proper places. They clean out the washbowl after washing their hands. They scrub the tub after taking a bath. They help their mothers to dust and make beds. What are some of the things you do to make your home clean and pleasant?

Flies help to spread disease by picking up germs on their sticky feet and then tracking the germs over food about to be eaten. Flies may lay their eggs in an uncovered garbage can or in any place where it is dirty and moist. The best way to get rid of flies is to clean up all the damp dirty places where they may lay their eggs. The best time to

kill flies is in the early spring before they lay their eggs. Killing one fly in April is equal to killing millions of flies in August. Flies may be kept out of homes in the summertime by putting screens in the windows and doors. All food should be kept covered. In cleaning up after a meal not a crumb of bread or a grain of sugar should be left lying about to coax in the flies.

Clean Schools

Are you glad when visitors praise your school? Just as your mother does her part to keep your home tidy and clean, so the school janitor does his part to make your school a clean and pleasant place. Do you know what

"

A street-cleaner in Austria

Burton Holmes from Galloway

RUBBISH

happens in your classroom when you are not there to see? Does the room look the same in the morning as it did when you ran out to play in the sunshine as school closed for the day? In many schools, after classes are over, the blackboards are washed and the erasers cleaned out of doors. The floors are cleaned and the furniture dusted. Fresh paper towels are placed in the washrooms. Scrap baskets are emptied. When the boys and girls come back to school in the morning, they are welcomed by the clean shining look of their school building.

Many boys and girls help their janitor and their teacher to keep the schoolhouse and schoolyard clean and pleasant. They are careful to throw used paper into the wastepaper baskets. They keep their desks looking neat. They brush their shoes at the door so as not to track dirt into the halls and classrooms. They sharpen their pencils over the wastepaper basket. They help to keep the coatrooms and lockers and washrooms clean and tidy. They make pretty posters to brighten up the walls. Sometimes they make posters telling about the things they should do to have strong healthy bodies. They water plants growing in pots or boxes in the classroom. The plants give the classroom a look of cheerfulness.

Clean Communities

Are you proud of your neighborhood? Nowadays the streets in most cities are kept clean. Men go around to all the homes two or three times a week to empty the garbage cans and trash baskets. Sometimes the streets are

" Are you helping to keep the streets clean in your neighborhood? 25

Steven A. Coons

washed at night. People have learned that a clean city is likely to be a healthy city. Boys and girls can help to keep their neighborhoods and their school playgrounds clean and pleasant. If you have anything to throw away, are you careful always to put it in a waste can? If you live in a small town that does not employ men to clean the streets, do you do your share in keeping your neighborhood clean?

A certain kind of mosquito spreads a sickness called malaria. Rain water standing in old tin cans or in mud puddles makes a fine home for baby mosquitoes. Boys and girls who live in parts of the country where malaria is common may help to fight mosquitoes by filling in low places where rain water collects and by making sure that there is nothing lying about in the neighborhood which might hold rain water.

ARE YOU DOING YOUR BEST TO KEEP YOUR HANDS, YOUR HOME, YOUR SCHOOL, AND YOUR COMMUNITY CLEAN AND TIDY?

Do you wash your hands with soap and water before eating whether they look dirty or not?

When the ground is muddy or dusty, do you clean your shoes before going indoors?

Do you put wastepaper, fruit skins, and other things you wish to throw away in wastepaper baskets or waste cans?

Do you have a place for your coat and hat and other belongings, and do you always put away your belongings in the proper places?

Do you use only clean dishes, spoons, forks, cups, and glasses?

1. Match each group of words in the list below the box with the word, group of words, or names in the box that you connect with it. (*Do not write in the book.*)

Benjamin Franklin	a certain kind of mosquito
anoint	aqueduct
grease and wood ashes	bad smells
flies	Louis Pasteur
Plato	

A great teacher who lived long ago in Greece.

That which supplies a city or town with water from a body of water many miles distant.

To rub with oil.

A famous man who thought cleanliness was necessary for success.

The materials out of which soap was made in pioneer days.

The principal thing with which people used to connect dirt.

The man who discovered that germs cause communicable diseases.

Insects that spread disease by picking up germs on their feet and then tracking the germs over food.

An insect that spreads a sickness called malaria.

2. Which of the following statements are true and which are false? Reword each false statement so as to make it true. (*Do not write in the book.*)

a. Dirt is unhealthy because a dirty place has a bad smell.

b. All germs are harmful.

c. We cannot see germs.

d. It is not necessary to wash the hands before eating unless they look dirty.

e. Dishes, glasses, and silver should be washed, after use, in hot soapy water and rinsed with boiling water.

f. A good health rule to follow is never to use a common drinking cup.

g. Flies are only nuisances.

h. It is not necessary for boys and girls to help in keeping their school clean, because this is the janitor's job.

i. Cleaning up after a picnic in a park or along the roadside is a sign of a good citizen.

THINK ABOUT THESE QUESTIONS

Why did Greek and Roman boys think it was important to be clean? Do you think one of the reasons may have been that they were expected to be clean? Was cleanliness made easy for them? In what ways is cleanliness made easy for most boys and girls today? Are you expected to be clean? Is it harder for an unclean person to get ahead than it is for a clean person?

DO THESE THINGS

1. Find out what you can about the people who first settled in your community. From what countries did most of them come? What habits of cleanliness had they learned in these countries? How did they keep their bodies, their clothes, and their homes clean? Ask your parents or your grandparents to tell you how they used to keep clean.

2. Write the names of several countries on slips of paper. Form class committees of three pupils each. Let a member of each committee draw a slip of paper on which the name of a country has been written. Each committee will then find out and report to the class what its members have been able to learn about the customs regarding cleanliness in the country named on the slip.

3. Find out how soap is made today. Where do the different things used in making soap come from and how are they brought to the soap factory?

4. Form a class committee to look over the school building and the school playground, with an eye to cleanliness and neatness. Have the committee report to the class. Talk over what the class may do to make the school building and school grounds cleaner and neater.

5. Notice the streets in your neighborhood and see which ones are the cleanest and neatest. Can you find out why some streets are more pleasant than others? How can you help to make your street one of the cleanest streets in town? Talk over in class all the ways in which boys and girls can help to keep their neighborhood clean.

6. If you live where water is brought into the town or city from a body of water outside, find out where this body of water is located, how the water is carried into the city, and what is done to keep the water pure. Your teacher may be able to take the class on a visit to the place from which the water you drink comes.

If you get your water from a well or a spring near your home, find out what reasons your family has for knowing that the water is pure.

7. If you like to write stories, you may write a story in which you explain to a Roman boy or girl the difference between taking a bath in America today and taking a bath in Rome long ago.

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

cleanliness	conquer	science
generations	aqueduct	microscope
community	anoint	communicable disease
instrument	tolerate	locker
citizen	habitation	malaria

2. Choose a word from the list of words above to complete each of the following sentences:

a. The study of the human body is a __?__.

b. Members of three __?__ live in Peter's home—his grandfather, his father and mother, and his sister and himself.

c. Eunice always hangs her hat and coat in her own __?__.

d. The people who live in Tom's __?__ help to keep the streets clean.

e. Germs can be seen only by looking at them through a __?__.

f. To be a good __?__ it is necessary to help to protect the health and safety of others.

g. The musical __?__ that Stella is learning to play is the piano.

UNIT II

How Cleanliness Helps Us to Make the Most of Ourselves

Two boys went to a store to ask for a job delivering packages after school and on Saturdays. Both boys were poor. Their parents could not afford to buy them new suits when worn places appeared in their pants and coats. The boys had many brothers and sisters, and their mothers could not always find time to sew on buttons or put on patches. One of the boys had learned to mend his own clothes. The other boy thought it was too much trouble to do this. He was a bright boy, quick at his lessons, and eager to earn money for his family. But he did not think that looks were important.

The first boy got ready to ask for the job by brushing his hair until it shone, by washing his hands, face, neck, and ears, and by cleaning his fingernails. He sewed a button on his coat and mended a rip in the sleeve. He polished his shoes. The other boy brushed his hair and washed his face and hands, but he forgot to clean his ears and his fingernails. He never even thought of sewing on missing buttons and mending a torn place in his pants. The storekeeper did not know the two boys. The only thing he had to go by in choosing between them was their looks. Which one got the job?

DO YOU KNOW

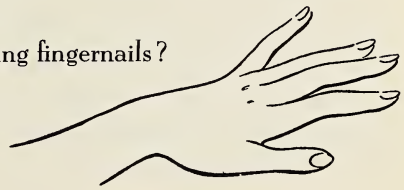
Why you have a skin?

Whether the skin you see is your true skin?

What perspiration is?

Why it is necessary to wash with soap and warm water to make your skin clean?

How to have neat-looking fingernails?



How to wash your hair?

Why it is never too hot or too cold inside a healthy body?

How to keep your hands from chapping?

HELPING THE SKIN TO DO ITS WORK

The things you buy in a store are wrapped in paper. The human body is wrapped in skin. The body inside its skin covering is alive. Living things must have food, water, and air; so you have a mouth and nose to let in these supplies. In order to see, you must have light. You have windows set in holes in the skin through which light enters the body. When you wish to shut out light, you pull down a curtain of skin over your eye windows.

These windows are big openings that you can see. There are other openings scattered all over the skin, which you cannot see. Have you ever looked at your skin through a magnifying glass? This is a glass that makes small things look much larger than they really are. Under a magnifying glass you see that the skin looks rough. It is dotted with little pits out of which hairs grow. If the glass is strong enough, you may see tiny openings in the skin. These openings are called pores.

Steven A. Coons

Looking at the skin through a magnifying glass

You have two layers of skin. The outside layer, which you see, is like a glove and fits very snugly over the inside layer. The inside layer is the true skin. It is called the dermis. The outside layer is called the epidermis. *Epi* in the Greek language means "upon,"

and *derma* means "skin." So *epidermis* really means "upon the skin." If you have ever had a blister, you have seen the two layers of skin separated from each other. The space between the two layers was filled with a liquid like water which came from the true skin. The epidermis protects the true skin from harm. It also acts as a wall to keep germs from entering the body.

The little openings called pores, which you can see by looking at the skin through a strong magnifying glass, are the mouths of tiny pipes that begin far down in the true skin. Salty water collects in these pipes and is emptied on the surface of the epidermis. This salty water is called sweat, or perspiration. You see sweat as drops of water on the skin only when you are very hot or when you have been exercising hard. Really you are always losing a small amount of salty water through the skin.

The little pits out of which hair grows also reach far down into the true skin. Oil flows into these pits and out along the hairs to the surface of the skin. This oil helps to soften the skin and the hair.

Sweat dries on the skin and leaves behind it a layer of salt so thin and so fine that you cannot see it. The oil on the skin catches and holds dirt. Oil and water do not mix. If oil is poured on water it floats at the top. If water is spilled on a patch of oil, it stands on the oily surface in little drops. Probably you have seen raindrops standing on the black oily patch left in the road by a standing automobile. You may have seen patches of oil floating on the water of a stream or lake after a boat has passed.

Washing the skin with water alone does not remove all the dirt caught in the oil on the skin, because there is some

dirt that water alone cannot reach. Soap dissolved in the water cuts through the oil and loosens the dirt caught in it. When the dirt is loosened, it is carried away from the skin in the soapsuds and water. It is necessary to take a warm soapy bath in order to make the skin really clean. A soap-and-water bath also washes away the salt left on your skin when sweat dries. Sometimes perspiration has a disagreeable odor. Warm water and any pure mild soap washes away the odor of dried perspiration. Some parts of the body perspire more than other parts. The feet and the hollows under the arms where the arms join the rest of the body are the parts that perspire most. For this reason you should wash your feet and the hollows under your arms on the days when you do not take an all-over bath.

The clothes worn next to the body soak up perspiration. They also become greasy from the oil on the skin. If possible, you should put on clean socks or stockings every morning. After taking a bath, put on clean underclothing. Do you like the feeling of clean underclothing next to your clean skin?

The true skin, which is covered by the thin outer layer, contains blood and nerves. The nerves in the skin make it possible for you to learn whether the things you touch are rough or smooth or hot or cold. They make you feel pain when you cut or burn yourself. Blood runs through the whole body in a system of tubes called blood vessels. It flows in a circle from the heart and back to it. For this reason we say that the blood circulates. It is pumped through the blood vessels by the beating of the heart. Blood is composed largely of water. It carries around to the different parts of the body all the supplies the body needs.

One very important thing which is carried by the blood is food. The food is dissolved in the water of the blood. Blood also spreads heat evenly through the body.

Body Temperature

The temperature of a healthy body remains always the same. If the inside of your body becomes too hot or too cold, you may feel ill. When you feel ill, the doctor takes the temperature of your body by putting a thermometer in your mouth. If the thermometer shows that you have 98.6 degrees of temperature, he says that your temperature is "

What will the doctor find out by taking this girl's temperature?
Find the arrow on the thermometer
shown in the upper right-hand corner.
Why does it point to 98.6 degrees?

Keystone, Galloway

normal. This means that the inside of your body is exactly as warm as it should be. But if the thermometer shows that your temperature is above 98.6 degrees, the doctor says you have a fever. This means that the temperature of your body is higher than it should be.

When muscles work, they make heat. Some of the muscles in your body are always working. Your heart muscle is one that works night and day. As some muscles are always working, heat is always being made in the body. Extra heat is made when you use the muscles fastened to your bones. This is why you feel hot when you play running games or chop wood or climb a long steep hill. The heat made by the working muscles heats the blood flowing through the muscles, just as water is heated in the boiler of a furnace. Usually when the muscles work hard, they make more heat than the body needs. If your body could not get rid of this extra heat, you would have a fever.

You get rid of extra heat through your skin. The heated blood circulating through the body flows through the tiny blood vessels in the skin. Have you noticed how red you become when you exercise hard? The blood vessels in the skin become larger to allow as much blood as possible to flow through them. The heat passes from the blood to the air surrounding your body, just as heat passes into the air from the radiator in a room. In fact, losing heat from the skin in this way is called losing heat by radiation.

You are always losing some heat through your skin by radiation even when the muscles are not working hard. One of the reasons that you wear clothes is to keep from losing heat too fast. When the air surrounding the body is very warm, you do not lose so much heat as you usually

do. This is why you feel warm on a hot day even when you are not using your muscles. On a cold day the tiny blood vessels in the skin shrink to keep as much blood as possible away from the skin.

Heat is lost from the skin in another way besides radiation. You know that wet clothes become dry when they are hung in the air. A pan filled with water becomes much less full after it has been allowed to stand for two or three days. The lost water has gone into the air. Losing water in this way is called losing water by evaporation. It takes heat to cause water to evaporate. You know that wet clothes dry much more quickly if you put them on a radiator. Water in a pan on a hot stove evaporates faster than water standing in a pan on a table. The evaporation of water from any surface makes the surface cooler because some of the surface heat is used to evaporate the water.

People who live in hot countries sometimes cool their drinking water by putting it in pitchers which contain tiny holes, or pores, through which the water can "sweat." The evaporation of the water makes the outside of the pitcher cool, and this helps to keep the water in the pitcher cool also. Exactly the same thing happens when you sweat. Water is poured out on the surface of the skin through the pores. The evaporation of this water cools the skin, and this helps to cool the blood flowing through the skin. The evaporation of sweat is the chief way in which you lose heat from your body on a hot summer day.

Warm Baths and Cool Baths

When you take a bath, your body is surrounded by water instead of by air. The way you feel after you take a bath depends on the temperature of the bath water. A cold bath or shower makes the blood vessels in the skin shrink in order to drive the blood toward the inside of the body. After the bath, hard rubbing with a towel brings the blood rushing back to the skin. Then the blood vessels expand; that is, they grow larger. The shrinking and expanding of the blood vessels give them exercise. After a cool bath or shower and a hard rub you should feel pleasantly warm. Many people take a cool sponge bath or shower bath in the morning and follow it with a dash of cold water, because they feel warm and wide awake afterward. But some persons feel chilly instead of warm after a cool bath. If a cool bath does not make you feel warm afterward, you should take only warm baths.

A warm bath keeps heat from being lost from the skin. It warms the blood, and so you feel warm all over. Does a warm bath sometimes make you feel sleepy? Many people find that they go to sleep more quickly if they take a warm bath just before going to bed. A warm bath also acts as a tonic by bringing more blood to the skin.

Bathing does more for your looks than just make you clean. It helps to keep the skin healthy by improving the circulation of blood through the blood vessels in the skin. The skin is fed by the food brought to it by the blood. Milk, green and yellow vegetables, fruits, and eggs give your skin the foods it needs to be healthy.

It is best not to take a bath or to go swimming for at

least two hours after eating. After a meal the stomach needs extra blood to help it to do its share in digesting food. If you take a bath or a swim soon after a meal, some of the blood needed by the stomach is carried to the skin and the muscles. Then the stomach cannot do its work properly.

Sleep and Play

Sleep and play out of doors also help you to have a healthy-looking skin. The skin of the face quickly shows a need of sleep. The cheeks may look pale, and dark circles may appear under the eyes. A fifth-grade boy or girl should have eleven hours of sleep every night in a dark airy room.

Have you noticed how rosy your cheeks are after playing out of doors? Exercise and fresh air bring the blood to the skin. The red color of the blood shining through the skin gives your skin its rosy color. Do you know the difference between skin which has an outdoor look and skin which has an indoor look? Have you noticed that boys and girls who play out of doors every day usually have pink cheeks? In the summer they have a coating of tan, and sometimes they have golden freckles sprinkled across their noses. An outdoor look is a healthy, jolly look.

HAIR AND FINGERNAILS

Your hair and your fingernails are part of your skin. Hair grows from the bottom of little pits which reach downward into the deep part of the true skin. The part of a hair which lies in one of these little pits is called the root. The hair root gets its food from the blood flowing

through the skin. The hair is kept soft by the oil which flows into the little hair pits, where the roots are growing. The oil runs out of the pits along each hair.

Fingernails and toenails grow out of the skin, just as hair does. Instead of growing from little pits, they grow out through folds in the skin. When the nail roots have grown out so far that they can no longer get food from the blood, they are changed into the solid bony plates which you call your fingernails and toenails. Nails help to protect the tips of your fingers and toes. The fingernails make it easier for you to pick up things.

You use your fingers so much that the spaces between the nails and the tips of the fingers often become filled with dirt. Do you like to look at dirty fingernails? Not many people do. But everyone likes to see clean shining nails. Do you think of your fingers as part of you? They are always on view, always in touch with the outside world, with things hard and soft, hot and cold, dirty and clean. How hard they try to obey your eager mind! Are you proud of what your fingers can do? Do you think your fingers deserve clean fingernails?

How to Have Soft Shining Hair

Your hair grows on your head, where everyone can see it. You may be clean and neat from your forehead down, but if your hair is dirty or tangled your whole appearance is spoiled. The oil in the hair catches dirt as easily as sticky flypaper catches flies. To have clean neat-looking hair, you should wash it every week with warm water and soap. The skin covering your head, out of which your hair

A good way to begin the day

KODACHROME BY STEVEN A. COONS

grows, is called the scalp. Brushing the hair hard every day brings the blood to the scalp. This helps to make the scalp and the hair healthy. Brushing also spreads the oil evenly through the hair. This is why well-brushed hair has a soft shining look.

In some schools the boys and girls learn in the health class how to wash their hair and clean and file their fingernails. Different pupils offer to have their hair washed so that the rest of the class may learn how it should be done. The act of washing the hair is called a shampoo. This is what boys and girls learn when they have a shampoo lesson.

"

The drawing in the circle shows a hair growing from the bottom of a hair pit

Roberts

If possible, get someone to help you wash your hair. Brothers and sisters often help each other. The things you need are a washbowl, plenty of warm water, some cool water, a large towel (if possible, two), a small towel, and a mild soap. Liquid soap is best. This may be made by slicing soap in warm water and letting it dissolve. Shaking helps to make the soap dissolve faster. Soap flakes may also be used to make liquid soap.

Before washing your hair rub your scalp with your finger tips and brush your hair thoroughly. Then put a towel around your shoulders and wet your hair. Pour some liquid soap on your head and rub it thoroughly over the scalp and through your hair. Work up a good

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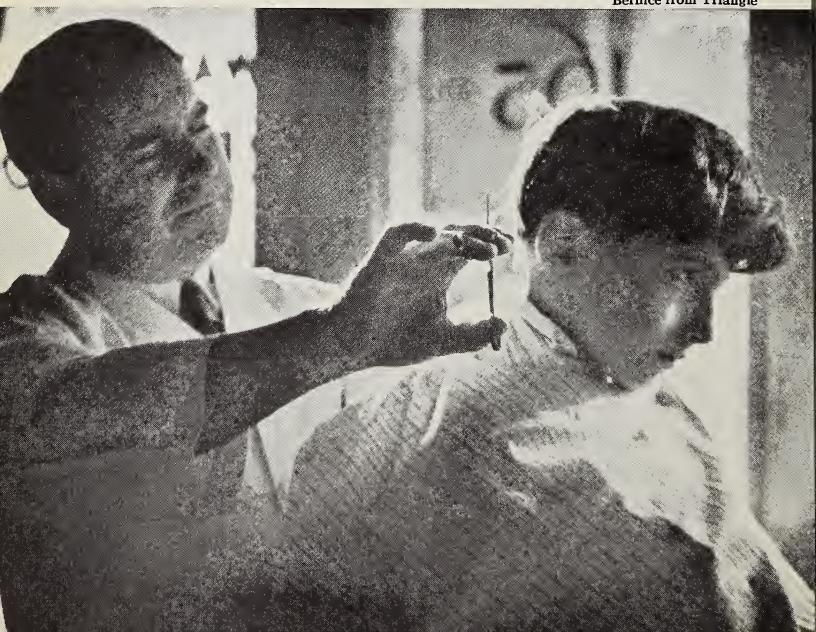
It does not hurt to have a haircut because the hair which shows above the surface of the skin is not alive

Bernice from Triangle



Working up a good lather

Roberts

lather. The best way to rinse your hair is to lean your head over the bowl and spray your hair with warm water from a spray fastened to the water faucet. If you have no spray, lean over the bowl and have someone pour warm water over your hair from a pitcher. Hold a small towel over your eyes to keep soap from running into them. Squeeze as much water out of your hair as you can and lather your head again with liquid soap. Then rinse your hair with warm water until all the soap is removed. Follow the second warm-water rinse with a dash of cool water. Then rub your head thoroughly with the large towel. It is best to have two large towels, if possible, so that a dry one may be used when the other is damp. Then rub your scalp and spread out your hair with your fingers until it is dry. Each time you wash your hair, wash your comb and brush with warm water and soap, rinse them thoroughly, and place them in the sun.

Small insects called lice sometimes get in the hair. The singular for lice is louse, just as the singular for mice is mouse. The Latin name for a louse is *pediculus*. Having lice in the hair is called pediculosis. Lice in the hair make the scalp itch. To keep from having lice use only your own comb and brush and wear only your own hat and coat.

Certain diseases of the scalp also may be carried from one person to another by combs, brushes, and hats. If you should happen to get lice in your hair, ask your school nurse or your mother to tell you how to get rid of them. An ordinary shampoo will not rid you of lice; nor will it remove all the eggs they lay in the hair.

How to Have Clean Shining Fingernails

The act of caring for the fingernails is called a manicure. This is what boys and girls learn when they have a manicure lesson.

Have on hand a basin filled with warm water, some soap, a towel, a nailbrush, a nail file, and a stick of orangewood or a toothpick wound at the tip with cotton. First file the edge of the nail until it has the shape of the end of the finger. Then put your fingers in the basin of warm water and scrub the nails thoroughly, using soap and the nailbrush. Dry your hands thoroughly. Clean the tips of the nails with the point of the nail file or with the orangewood stick or the toothpick wound with cotton.

The skin about the nails is called the cuticle. Push back the cuticle very gently with the orangewood stick or the toothpick. Hangnails are caused by breaks in the cuticle. Never pick at a hangnail. Ask a grown-up person to cut it off for you with small scissors that have been boiled for five minutes, and then put on iodine.

After cleaning the nails, rub a little olive oil or cold cream around the nails and polish them on the palm of the hand. Then rub the palms and backs of

"

After the shampoo, dry your hair out of doors if the day is warm and sunny

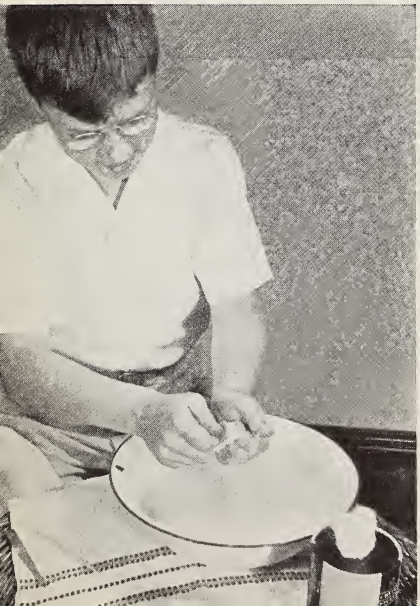
Steven A. Coons

the hands over each other until they feel soft and comfortable. Oil or cold cream will help to keep your hands from chapping in cold weather.

Biting the fingernails spoils their looks. It makes the ends of the nails so short and so rough that it is almost impossible to keep them clean. The tips of the fingers become flat and stubby because they are not protected by the nails as they are meant to be. Boys and girls who bite their nails take into their mouths dirt, germs, and pieces of sharp nail that may scratch the mouth and throat. It is very hard to break the habit of biting the fingernails. Taking proper care of the fingernails and the cuticle sometimes helps to break the habit.

It pays to have clean hands and well-manicured fingernails. It make you feel better. You remember how you feel when you get a new hat or new suit of clothes. It is becoming to you, and you look at yourself in the mirror several times. You feel happy. It is much the same with having neat-looking hands. They give you a feeling of pleasure.

Steven A. Coons



In business your chances of success are better if you do not have to be ashamed of meeting people because of unclean hands.

"

Beginning a manicure with a good scrub

ARE YOU DOING YOUR BEST TO BE CLEAN AND GOOD-LOOKING?

When you start for school in the morning do you ask yourself these questions?

Are my face, neck, and ears clean?

Is my hair brushed?

Are my teeth brushed?

Are my hands and fingernails clean?

Have I a clean handkerchief?

Are my clothes neat?

Are my stockings clean?

Are my shoes shined?

Do you have at least two warm soap-and-water baths every week?

Do you wash your feet and the hollows under your arms with soap and water on the days when you do not take an all-over bath?

Do you wash your hair every week?

Do you put on clean underclothes after each bath?

Do you sleep eleven hours every night?

Do you play out of doors every day?

1. Choose the best ending for each one of the following sentences. (*Do not write in the book.*)

a. The outside layer of skin is called the (1) dermis (2) epidermis (3) pores.

b. The temperature of a healthy body is always about (1) 96 degrees (2) 100 degrees (3) 98.6 degrees.

c. Body heat is made by (1) working muscles (2) taking a hot bath (3) wearing clothes.

d. Heat passes from the blood to the air surrounding the body by (1) evaporation (2) radiation (3) perspiration.

e. When cold air or cold water strikes the skin, the blood vessels in the skin (1) lose heat by radiation (2) expand (3) shrink.

f. The bottom of the little pits out of which a hair grows is located in (1) the epidermis (2) the dermis (3) the blood vessels.

g. The hair should be washed with soap and water (1) every two weeks (2) every week (3) every month.

h. Hangnails are caused by breaks in (1) the fingernails (2) the dermis (3) the cuticle.

2. Complete the following sentences by supplying the missing words. (*Do not write in the book.*)

a. Perspiration flows out on the skin through the __?__.

b. The dermis is protected from harm by the __?__.

c. The epidermis is kept soft by __?__ which flows from the little pits out of which hair grows.

d. The only way in which the skin can be cleaned thoroughly is by __?__ with __?__ and __?__.

e. After taking an all-over bath, you should put on __?__ __?__.

f. The blood vessels and nerves in the skin are located in the __?__.

g. When the muscles fastened to the bones work hard, they make extra __?__.

h. As perspiration dries, heat is lost from the body by __?__.

i. Food for the skin is brought to it by the __?__.

j. Brushing the hair hard brings blood to the __?__ and helps to spread __?__ evenly through the hair.

k. One reason for using your own comb and brush and wearing only your own hat and coat is to protect yourself from __?__.

l. Biting the fingernails spoils their __?__.

THINK ABOUT THESE QUESTIONS

Have you ever thought of yourself as a walking advertisement? The people who have goods to sell try to make their goods look as nice as possible. They say pleasing things about their goods when they advertise in newspapers and magazines and over the radio. What does your appearance tell other people? Does it tell people that you are clean and healthy and cheerful?

DO THESE THINGS

1. Look through one of the big national magazines and make a list of all the advertisements that advertise things used to improve personal appearance. How many advertisements are on your list? How many advertisements are in the whole magazine? Does this give you some idea of how important personal appearance is thought to be in our country today?

2. If possible, look at your skin through a large magnifying glass. Make a drawing of what you see.

3. Put a few drops of water on your arm. What happens? Rub a little soap on your arm and put a few drops of water on the soapy place. What happens? Why? Have you ever heard anyone say that this or that runs off "like water off a duck's back"? Find out what the person meant.

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OF ALBERTA

4. Have a manicure lesson in class. Ask the children from one of the lower grades to come to your room and watch a boy or girl give a manicure. If possible, you may also have a shampoo lesson in class.

5. Here is a list of the things to which you must give attention every day if you are to look clean and neat.

face and hands	fingernails	clothes
hair	teeth	shoes

Make another list in which you describe the sort of attention you give to each thing named in the list above. For example, what must you do in order to have clean teeth and how often must you do it?

6. Find out something about the way in which a thermometer works. For example, why does the fine silver or red line in the tube of a thermometer move up or down according to the temperature of the place in which the thermometer is located? Why is the thermometer usually used to measure temperature called a Fahrenheit thermometer? What do you know about the air of a room when the room thermometer shows that the temperature is 68°? What does 98.6° on a doctor's thermometer stand for?

WORD STUDY

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

magnifying glass	radiation	shampoo
pores	evaporation	louse (*pl.* lice)
dermis	evaporate	pediculosis
epidermis	liquid	manicure
circulate	appearance	cuticle
circulation	hangnail	Fahrenheit thermometer
normal temperature	expand	

2. From the list at the bottom of page 52 select the word described by each one of the following groups of words:

a glass which makes things appear to be larger than they really are
having lice in the hair
the act of washing the hair
the act of caring for the fingernails
to grow larger
the skin about the nails
to flow in a circle
the way a person looks

UNIT III

Helping the Body to Make the Best Use of Food

Tom had a camera. His father had given it to him on his tenth birthday. Tom took his camera to school to show his friends. On the way home from school he saw Betty and Billy racing each other down the street.

"Hi, Billy," called Tom. "Stop! I want to take your picture."

"I can't stop," shouted Billy. "I'm running a race."

Tom snapped a picture of the children racing.

Across the street, Roger and Ellen were sitting on the steps of their house. They did not seem to want to play any games. They just sat talking.

"Hi, Tom," called Roger. "Aren't you going to take our pictures?"

"All right," said Tom, good-naturedly. "Smile!"

Betty and Billy are twins. They like to run in the wind and feel it pull their hair. They are good at running races and playing baseball. They like to go to school and learn interesting things about the world in which they live. They have strong firm muscles and rosy cheeks and red lips. Their teeth are strong and straight and their gums pink and firm.

Betty and Billy drink milk at every meal. They have an orange or a grapefruit, or a glass of orange juice or tomato juice, and one other

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The picture Tom took of Betty and Billy. Are they having more fun than Roger and Ellen?

Steven A. Coons

kind of fruit every day. They eat plenty of eggs, cooked green and yellow vegetables, and salads made of raw vegetables. They have a helping of meat or fish or macaroni and cheese or baked beans once a day. They eat whole-wheat bread or toast spread with butter at every meal. Each one has a big bowl of brown cereal with milk and a little sugar for breakfast every morning.

Ellen and Roger do not have such good times as Betty and Billy have. Roger looks as if he had plenty to eat. He is much fatter than Billy, but his muscles are softer. He cannot throw a ball as far as Billy can. He cannot get to first base as quickly. Ellen does not like to play games with the other boys and girls. She gets tired too easily.

Ellen and Roger drink coffee for breakfast instead of milk. They eat a great deal of meat and potatoes and gravy and white bread. When they have a few pennies to spend, they buy candy or soda.

You have learned that cleanliness is one of the things that helps people to make the most of themselves. The food that you eat makes an even bigger difference in the way you look and how you feel. Eating enough of the right kinds of food helps boys and girls to grow big and strong and healthy and so to make the most of themselves.

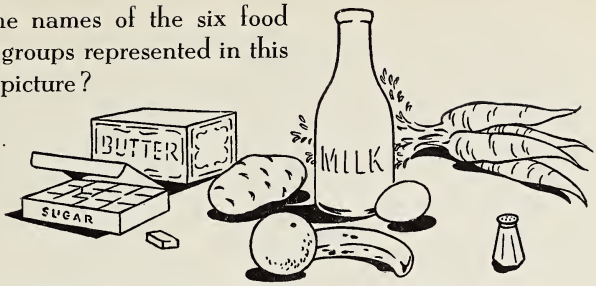
Steven A. Coons

"

The picture Tom took
of Ellen and Roger

DO YOU KNOW

The names of the six food groups represented in this picture?



How the body uses fat, sugar, and starch?

Which food materials help to make you grow?

Why bones and teeth are the hardest parts of your body?

What vitamins are?

How to build healthful meals?

What happens to food after you have eaten it?

How your body gets rid of food that it cannot use?

What a laxative is?

The name of the body waste that is removed through the lungs?

How you can help your body to digest food?

How to take good care of your teeth?

THE SIX FOOD GROUPS

Betty and Billy were making a cake. It was their mother's birthday, and the cake was to be a surprise for her. The children found the recipe for the cake in their mother's cookbook.

"We must be careful to follow the directions exactly," said Betty. "Mother says a cake will not be good unless it has every single thing in it that the recipe calls for."

"No, we can't leave out even a tiny bit of salt," said Billy.

Betty measured the flour, butter, milk, and sugar, and carefully separated the yolk from the white of each egg. Billy beat the eggs and stirred the cake mixture. They made sure that the temperature of the oven was just right before they put in the cake. They tiptoed around the kitchen while the cake was baking. They had heard their mother say that a cake might sink down in the middle if it was jarred.

The cake turned out beautifully. Betty and Billy decorated it with candles and flowers. They washed all the dishes and pans they had used. When Mother came into the kitchen to get supper, there was not a single dirty dish or spoon to give away the secret that a cake had been made a little while before. It was a great surprise to Mother when Betty carried in the cake while Father and Billy sang "Happy birthday to you!"

In school the next day, the health lesson was about foods. Billy told about the cake he and Betty had made. Miss Lane, the teacher, said that building a good body

Betty and Billy making a cake. What must they be careful to do

Steven A. Coons

out of food was like making a good cake. "Just as Billy and Betty made their cake out of different kinds of raw materials, so a body is made out of different kinds of raw materials," she said. "Not a single raw material that your body needs can be left out if you want your body to turn out well."

"But there isn't any recipe for bodies as there is for cakes," said Billy.

"Oh, yes, there is," said Miss Lane. "We call the milk, eggs, flour, and sugar that are used to make a cake the raw materials of the cake. The recipe for a healthy body calls for certain raw materials which we get from what we eat and drink. Milk, eggs, meat, vegetables, fruits, and other foods contain these raw materials."

"But I thought milk was just milk," said Laura. "We can't make milk. Only cows can make it."

"Yes, only cows and other mother animals can make milk," said Miss Lane. "But milk is made out of things in the food the cow eats. If we find out what milk is made of, then we shall know about all the different kinds of food materials that the body needs in order to grow, move, keep warm, and be healthy. There are six food groups, and all six are represented in milk. Milk is the most complete food we have."

The Fats

When you look at a bottle of milk that has stood awhile in the refrigerator, or icebox, you can see that the top part and the bottom part look different. The top of the milk is yellow. The bottom part is white. You know that the thick yellowish milk at the top of the bottle is called cream.

Gendreau

Cooking beefsteak over hot coals on a picnic.
Why are the fatty parts of meat and other fat foods called fuel foods?

"

You may pour off the cream into a bowl and beat it with an egg-beater until it becomes thick. This is called whipped cream. Do you like whipped cream on cocoa and desserts? If you should keep on beating the whipped cream long enough it would turn to butter.

Cream and butter are members of the group of foods called fats. Most of the fat foods you eat every day come from animals. Butter is an animal fat, as it is churned from milk made by a cow. If you look at a strip of bacon, you see that it has wide strips of fat between thin strips

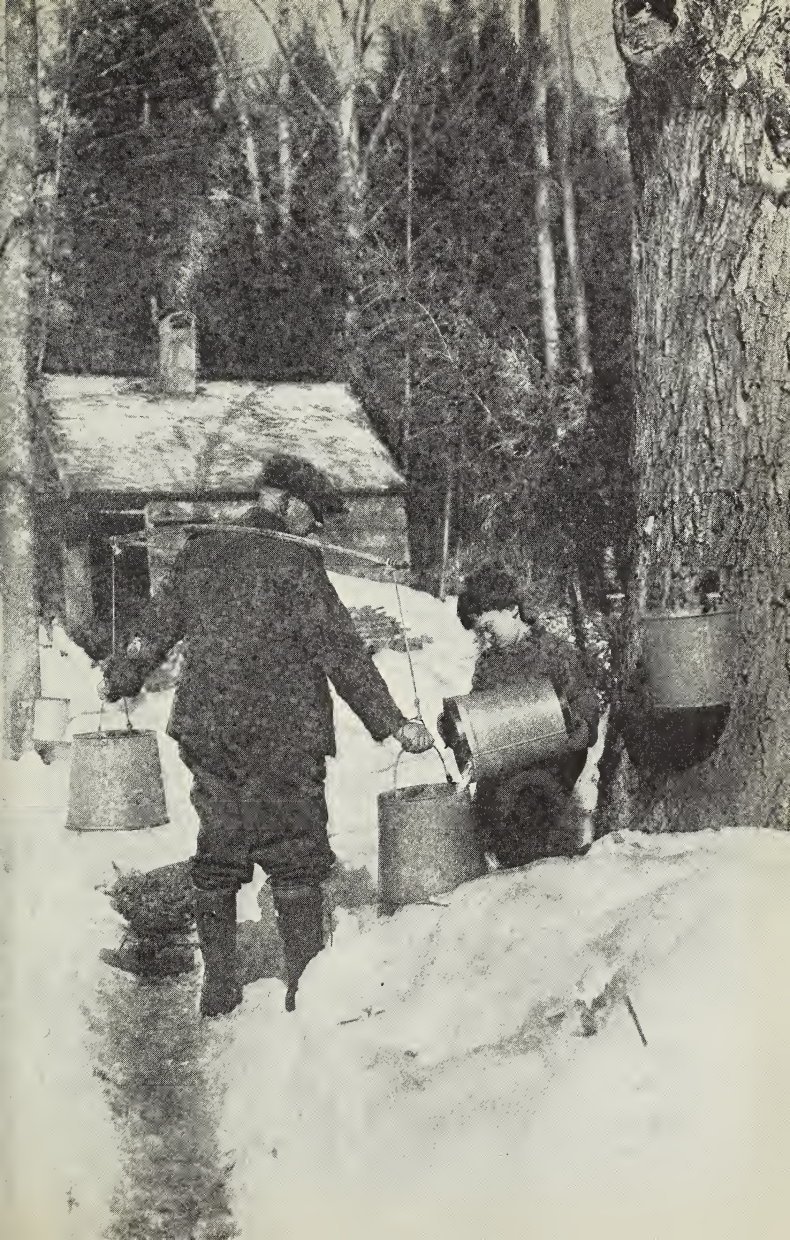
of lean meat. Jack Spratt and his wife must have had a hard time of it when they had bacon for breakfast. Other meats, such as lamb, beef, and pork, all have fat mixed with the lean meat, but usually it is possible to separate most of the fat from the lean when you eat meat.

Vegetable fats usually are called oils. Olive oil is often used to make salad dressings. Nuts also contain oil. Have you ever smashed the kernel, or meat, of a walnut when you were cracking the nut? The next time you do, rub a little of the crushed nut meat between your fingers and notice how oily it feels.

If you have ever cooked a piece of beefsteak over hot coals, you know that the fat from the meat bursts into flame when it drips into the fire. The fats and oils in food also burn inside your body. For this reason they are called fuel foods. The burning of fuel foods inside the body is a slow burning without flame. You do not see flames bursting from an automobile as it moves down the street. And yet it is the burning of gasoline in the engine that gives the automobile the power to move. As the gasoline burns, the engine gets warm. The faster the engine runs, the hotter it gets. Your muscles are the engines of your body. In order to work, your muscles must have fuel foods to burn. The working of your muscles gives you the power to move. The heat made by the burning of fuel foods in the muscle engines keeps you warm. The faster you walk or run, the hotter you get. On a cold winter morning when you are going to school you walk fast because you realize that walking fast makes you feel warmer.

Gathering sap from maple trees. To what group of food does maple sugar belong

Gendreau



The thin white milk left in the bottle after most of the cream has been poured off is called skim milk. You may beat skim milk as long as you have strength to turn the egg-beater, but it will not become whipped cream or butter. However, if you pour the skim milk into a pan and set it in a warm place for about twenty-four hours, it will become as thick as the custard you sometimes have for dessert. This thick milk tastes sour. Indeed, it is called sour milk. Suppose you put the sour milk into a bag made of cheesecloth and hang it up over a bowl. A liquid will drip from the sour milk through the cheesecloth into the bowl. This liquid is called whey. It is mostly water. But if it is boiled until all the water has evaporated, a small amount of solid material will be left on the bottom of the pan. This is milk sugar.

The sugar belongs to a group of fuel foods called the carbohydrates. Sugar, as well as fat, is burned in the body to keep you warm and to give you the power to move. Milk is about the only animal food that contains sugar. The honey which the bees make is full of sugar, but they make it from the sweet juice of flowers. Most sugars are found in the sap and fruits of plants. Maple sugar comes from the sap of the maple tree. Ordinary sugar comes from the sap of sugar cane or from the juice of beets. Many fruits are sweet because their juice contains sugar.

Starch also is a carbohydrate. It is found mostly in vegetables and grains. A vegetable that is very rich in starch is the potato. Cereals and bread, which are made of grains, also contain a great deal of starch.

Water

The whey of milk is mostly water. Perhaps you have never thought of water as a food. But two thirds of the body is water, and most of the work of the body is done with the help of water. Most foods contain water. Liquid foods, such as milk, cocoa, fruit juices, and soup, contain the most. However, they do not contain enough to supply the body with all the water it needs. Each day you should drink at least six glasses of water.

The Proteins

When the watery whey stops dripping from the sour milk in the cheesecloth bag, a soft thick lump of white material is left. This is called the curd of milk. When it is mixed with a little salt and butter or cream it is called cottage cheese. The curd, or cheesy part, of milk belongs to a group of foods called the proteins. Foods besides milk and cheese that are rich in protein are lean meat, fish, eggs, peas, and beans. Grains also contain some protein.

The proteins in food are used in the body as building material. Your muscles are mostly protein. About half of your body is muscle. In order that your body may grow, your muscles must grow. Different parts of your body wear out with use and must be repaired, or built over again. The food that contains the best proteins for growth and repair are the proteins in milk.

The Minerals

A group of food materials called minerals also are represented in milk. One form of mineral material is represented by the solid lumps of iron or gold or silver ore which miners dig up out of a mine. But minerals also take the form of salts. Ordinary table salt is a mineral material. You know that salt dissolves easily in water. Many mineral salts are dissolved in the watery part of milk. The two principal ones are calcium—a material which is a part of lime—and phosphorus. Look at your teeth in a mirror. Feel the bones of your arms and legs. Why is it that a liquid food like milk can build something as hard as bones and teeth? Have you ever watched men mixing cement? Do you know why it is that the soft puddle of lime and water in the mixing trough becomes so hard and strong that it can hold bricks and stone tightly together? The material in lime which makes the cement harden is the mineral calcium. The reason why milk and also food made from milk, such as cheese and ice cream, can make your bones and teeth hard is because milk contains calcium and phosphorus.

The body uses many other mineral salts besides calcium and phosphorus. One of the most important is iron. Have you ever seen a piece of old rusty iron? The body needs each day an amount of iron equal to a single speck of iron rust. Foods that are especially rich in iron are egg yolks and liver. Whole-wheat cereals, beans, peas, spinach, prunes, and apricots also contain iron.

Another group of food materials is represented in milk, which you cannot see as you can see fats, carbohydrates, water, and proteins. The name given to these food materials is vitamins.

Have you read the story of Alice in Wonderland? Alice became very tiny when she drank out of one bottle, and so tall that her head shot out of the chimney when she drank out of another bottle. The same thing happened when she nibbled first one side and then the other side of a mushroom. You know that this story is a fairy tale.

From a drawing by Sir John Tenniel in the 1866 edition of *Alice in Wonderland*

Alice in Wonderland
and the magic mushroom.
In real life, foods which contain
vitamins make a great difference
in growth and health
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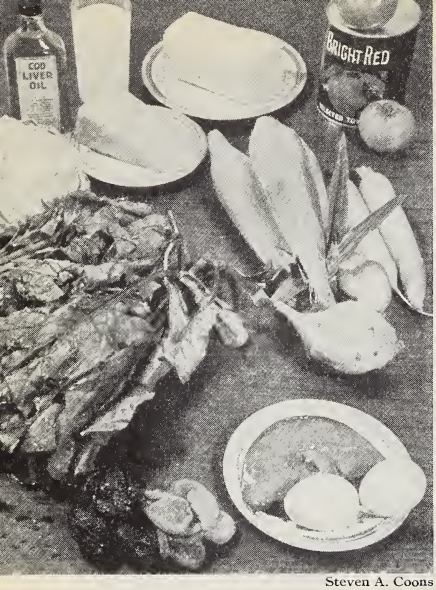
And yet in ordinary everyday foods, such as milk, eggs, oranges, apples, bananas, tomatoes, carrots, cabbage, spinach, lettuce, celery, sweet potatoes, brown cereals, whole-wheat bread and butter, and liver, you eat vitamins that really and truly make a difference in the way you grow. Not only do they help you to grow sound teeth, firm pink



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Foods that are rich in vitamin A: milk, butter, and cheese; green-leaf and yellow vegetables; fruits; tomatoes; liver, eggs, and fish-liver oil

gums, strong straight bones, and strong muscles, but also they help to protect you from certain diseases. Each member of the vitamin group has a letter of the alphabet for its name. The vitamins needed by growing boys and girls are vitamins A, B, C, D, and G. In the pictures on this page and pages 69, 70, and 71 you will find foods that supply vitamins A, B, C, and G.

PLANNING MEALS

The raw materials called for in a cake recipe make the cake, and the raw materials of your daily meals make you. In planning three meals a day we must be careful not to leave out a single food material that the body needs. As a start in building meals we should choose the very best food we know about. This food is milk. Milk supplies more materials that the body needs than does any other one food.

Bread and cereals are the cheapest kinds of energy foods we have. The best breads and cereals are those that are made of all the grain. The brown outer coats of grain con-

tain minerals and vitamins and a coarse material called roughage. Roughage in food helps to make the bowels move.

In building three meals a day, this is how we may begin:

Breakfast

A glass of milk
A dish of dark cereal with milk
Whole-wheat bread and butter

Lunch or Supper

A glass of milk
Whole-wheat bread and butter

Dinner

A glass of milk
Whole-wheat bread and butter

These three meals contain almost all the food materials the body needs except vitamin C and vitamin D. Vitamin C is necessary for building strong teeth and firm pink gums. Raw milk contains vitamin C, but usually the milk you drink has been pasteurized. This means that it has been heated and then cooled

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Foods that are rich in vitamin B: hearts of wheat and whole-grain bread and cereals; fruits and green-leaf vegetables; milk, eggs, and yeast

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Foods that are rich in vitamin C: oranges, grapefruit, and lemons; tomatoes, fresh or canned; raw vegetables and fruits

quickly in order to destroy any harmful germs it may have contained. The heating destroys part of the vitamin C. Citrus fruits and tomatoes are rich in vitamin C. The citrus fruits that you probably know most about are oranges, grapefruit, and lemons. To get enough vitamin C for the day, we may add an orange, half a grapefruit, or tomatoes to our breakfast, and a raw vegetable, such as cabbage, carrots, lettuce, or celery, to our lunch or dinner.

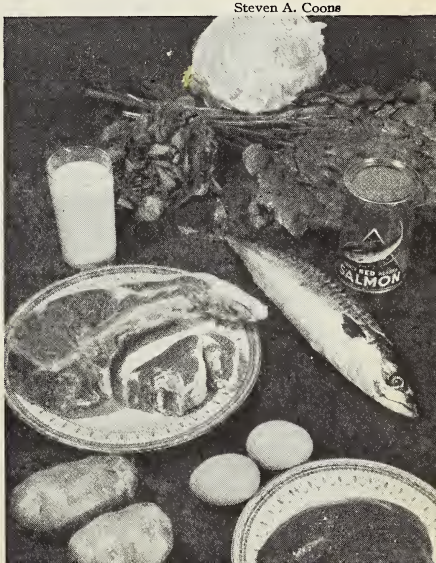
There is very little vitamin D in foods that you eat every day. Your body makes this vitamin for itself with the help of summer sunlight shining directly on the bare skin. For this reason vitamin D is sometimes called the "sunshine vitamin."

Vitamin D makes it possible for the body to use calcium and phosphorus in building bones and teeth. When children do not get enough vitamin D, their bones and teeth may be soft. They may have bowlegs and narrow jaws and chests, and teeth that decay easily. In the wintertime the sunlight is not strong enough to help the body to make vitamin D for itself. We have another way of get-

ting this vitamin. It is found in oils pressed from fish livers. Probably the fish-liver oil that you know most about is cod-liver oil. Cod-liver oil is not a medicine. It is a food. Ordinary milk contains very little vitamin D; but there is a kind of milk called vitamin-D milk which is rich in this vitamin. In order to get enough vitamin D in the wintertime we may drink vitamin-D milk with our meals instead of ordinary milk or else take cod-liver oil.

If we could not afford to buy other foods, we could get along on daily meals made up of a quart of milk, plenty of whole-wheat bread and butter, dark cereal, an orange or tomatoes, a raw vegetable,—such as cabbage, carrots, lettuce, or celery,—and cod-liver oil in the wintertime. But it is much better to have other foods for variety and for extra supplies of protein, minerals, and vitamins. In place of part of the bread and butter and cereal we may add to our meals each day one or two helpings of a cooked green or yellow vegetable, a helping of potatoes, another kind of fruit, an egg, and a helping of meat, fish, cheese, beans, or peas. We may also have a simple dessert for lunch and for dinner. We should not eat too many rich desserts.

Steven A. Coons



Foods that are rich
in vitamin G:
meat, fish, potatoes
and green-leaf vegetables,
milk, and eggs

Here is an example of a good breakfast, lunch or supper, and dinner built up by adding these foods to the foods with which we started:

Breakfast

A glass of milk
A dish of oatmeal with whole milk
An orange
A poached egg on toast

Lunch or Supper

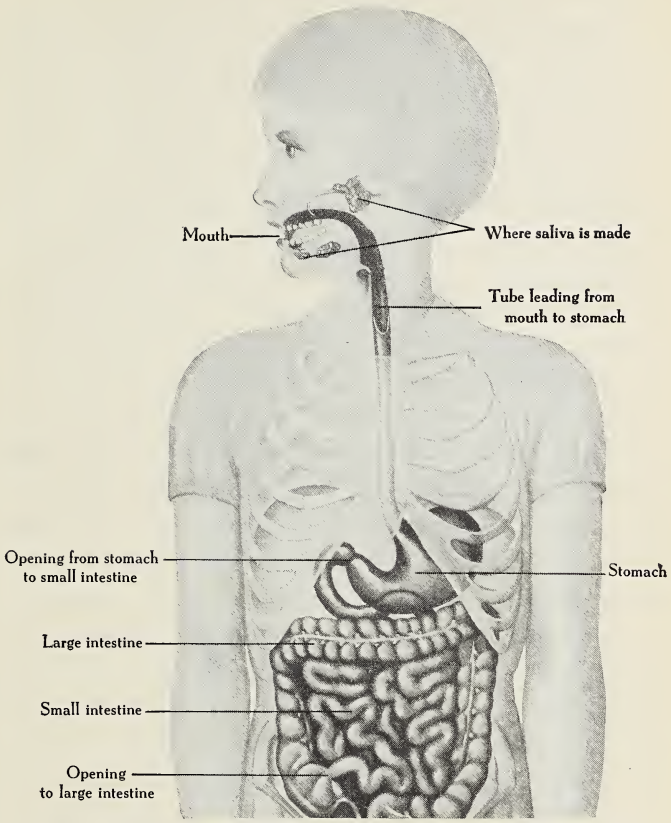
A glass of milk
Tomato soup
Cream-cheese-and-jelly sandwich
Lettuce sandwich
A banana

Dinner

A glass of milk
Whole-wheat bread and butter
A lamb chop (cooked in the oven, not fried)
Creamed potatoes
Buttered carrots and peas
Celery
Cup custard

HOW FOOD IS MADE READY FOR USE IN THE BODY

The body must first take food apart before the materials in the food can be put together again to make skin, bones, teeth, hair, muscle, and blood. People can make false hair and false teeth fairly well with a great deal of



The workshop in which food is made ready for the body to use

trouble and expense. But real hair and teeth are only two of many things that our bodies make for us every day out of the materials in our breakfast, lunch, and dinner.

The workshop in which food is made ready for the body to use is called the digestive system. Here the food is ground up into fine bits, dissolved in water, and mixed with digestive juices which change it into very simple materials.

The digestion of food begins in the mouth. Your teeth grind up the food and mix it with a digestive juice called saliva. Saliva is a watery liquid which always keeps your mouth wet. One reason for chewing food well is to mix it thoroughly with saliva. The starch in bread, cereals, potatoes, and other starchy foods must be changed into sugar by the saliva before your body can use it as fuel.

When you think you have chewed a mouthful of food long enough, you swallow it. The food goes down a long tube to the stomach. From the stomach walls another digestive juice is mixed with the food. When the food has been well mixed with this juice, it passes a little at a time into the small intestine.

The small intestine is a soft tube about twenty feet long. It is folded up in the space below the stomach. As soon as food passes out of the stomach into the small intestine, three more digestive juices are mixed with it. These juices finish up the job of digestion. After the food has been completely digested, it is so full of water that it looks like thin cream soup. This liquid food is sucked up into tiny blood vessels in the walls of the small intestine. The blood carries the food to all the parts of the body that need it for fuel or building or repair material.

Food that is not completely taken apart and dissolved in water cannot pass from the small intestine through the walls of the blood vessels into the blood stream. Part of the food you eat cannot be digested no matter how well it is chewed and mixed with the digestive juices. If you mix sand and sugar together and put them into a glass of water, the sugar will dissolve but the sand will not dissolve. In food there are materials that will not dissolve. These materials are found mostly in fruits and vegetables and in the coarse outer parts of grain.

Undigested food is pushed on by the muscles in the walls of the small intestine into the large intestine. The large intestine is only about five feet long, but it is bigger around than the small intestine. When the undigested food reaches the lower part of the large intestine, it is mostly solid. You get rid of this solid waste material in the form of a bowel movement.

If solid wastes are allowed to stay in the lower part of the large intestine for more than a day, the work of the whole digestive system is slowed up. What would happen if the garbage can and the ash can and the wastepaper baskets in your home were not emptied regularly? Would not the work of the home be rather upset? The work of the digestive system is upset if you do not have a bowel movement every day. You may feel tired and cross, your head may ache, and you may lose your appetite. Your skin may look muddy instead of fresh and rosy.

People who go for a day or more without having a bowel movement are said to be constipated. They may

have to take a medicine, such as castor oil or Epsom salts, to make the bowels move. Such a medicine is called a laxative.

If laxatives are taken often to make the bowels move, the large intestine forms the habit of depending on the laxative instead of on its own movements to send solid waste matter out of the body. By eating plenty of fruits, vegetables, and whole-grain bread and cereals, and by drinking plenty of water each day, you may help the large intestine to do its own work. A lazy, slow-working large intestine makes the whole body suffer. A strong, hard-working large intestine helps to keep the whole body healthy.

To form habits we do the same things over and over again in the same way. To form the habit of a daily bowel movement, we must train the large intestine to send waste material out of the body at the same time every day. This is why it is so important to set a certain time to have a bowel movement and to stick to it. Most boys and girls find the time right after breakfast to be the best time. Always obey the desire to have a bowel movement. If you put off going to the toilet, so much water may be taken out of the solid waste material in the lower part of the large intestine that it will be difficult for the bowels to move later on. Always wash your hands with soap and water after going to the toilet.

Getting Rid of Wastes Made by the Body Cells

What happens to the digested food that passes into the blood stream from the small intestine? It is carried in the blood to all the parts of the body that need it. The food is used by the body cells for fuel, building, repair, and other important work.

All this work cannot be done without making waste. When you saw a board, sawdust is left over even if you use every scrap of the board in building something. Smoke rises from a burning fire, and ashes are left when the fuel is completely burned up. In using food for building and for fuel the cells make a certain amount of waste. This waste must be sent out of the body or you will die.

One kind of waste is removed through the lungs. You cannot see it. It is a gas. Have you a gas stove at home? If so, you know that you cannot see the gas when your mother turns it on to light it. Air is made up of different gases mixed together. Oxygen is one of these gases. The reason you must breathe in oxygen in order to stay alive is because the cells must have oxygen in order to burn the fuel food. When anything burns, a waste gas called carbon dioxide is made. This waste gas is collected from the cells by the blood and carried to the lungs. You get rid of carbon dioxide each time you breathe out.

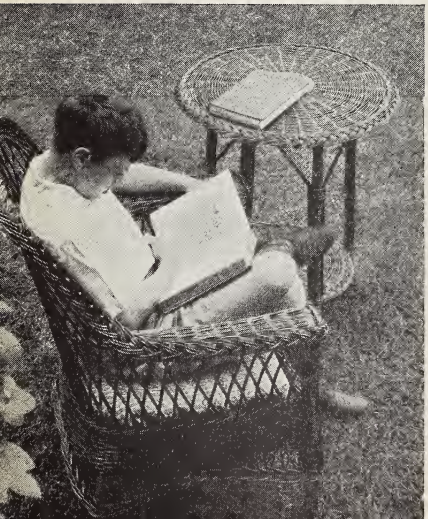
The wastes left over from the building work done by the cells are also collected by the blood. These wastes are carried to the kidneys to be removed from the body. The kidneys are two small bean-shaped organs. They are located at about the middle of your back. One kidney lies on each side of the backbone. The waste materials

dissolved in large amounts of water pass from the blood stream into the kidneys. From each kidney this liquid waste drips down a tube into the bladder. The bladder is a small bag that holds the liquid waste until you are ready to remove it from the body. This liquid waste is called urine. About half the water you drink is used to remove wastes through the kidneys. The most important thing you can do to help remove liquid wastes from your body is to drink plenty of water.

HELPING THE DIGESTIVE SYSTEM TO DO GOOD WORK

The digestive system has often been compared to a mill in which food is made ready for the body to use. Except for chewing and swallowing, this mill seems to run all by itself. But the digestive system cannot think. We must think for it. We must do the things that will help it to work properly. Here are some of the things we can do.

Steven A. Coons



Giving the stomach a chance to work in peace

Eat three regular meals every day and do not eat between meals. Eating between meals may take away your appetite for your regular meals. If you are hungry at recess or after school, a piece of fruit or a glass of milk is the best food to eat. Always wash fruit before you eat it.

Take plenty of time to eat. Chew each mouthful of food thoroughly. Why is this a good rule?

Make mealtime a pleasant time. Boys and girls sometimes spoil a meal for everybody by quarreling or arguing at the table. Upset tempers may cause upset stomachs. Cheerfulness, courtesy, and good table manners help to make mealtime a happy cheerful time for everyone.

When you have been working or playing hard, you will enjoy a meal more if you take a rest beforehand. Wash your hands and face, brush your hair, and clean your fingernails before the meal. It is pleasant to know you are looking your best.

Keep from eating fried foods. Foods which are covered with fat are not digested easily because the digestive juices in the mouth and stomach cannot dissolve the fat to get at the food inside.

Give your stomach a chance to work in peace for about half an hour after a meal. The stomach needs an extra supply of blood to begin its work. But the muscles that move your bones must have extra blood, too, when they are working hard. If you play running games or jump rope or hurry on the way to school after a meal, the stomach is forced to wait for the extra blood it needs. This delay sometimes upsets the stomach so much that it aches.

Play outdoors in the sunshine every pleasant day. Exercise helps to make the muscles of the digestive system strong and springy. It also helps to give you a good appetite.

Get eleven hours of sleep each night. Your body cells use food for building and repair mostly while you are asleep. In sleep things quiet down inside your body just

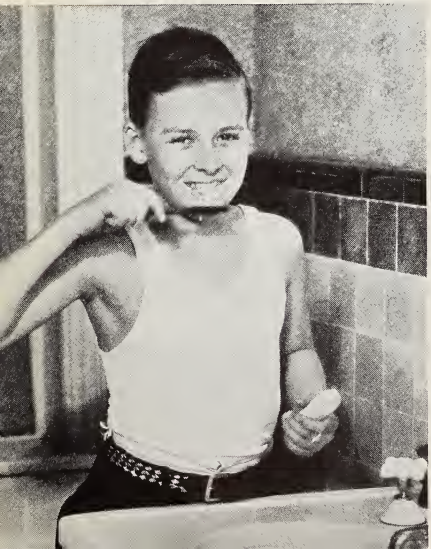
as a house quiets down when all the people are in bed. Your heart beats much more slowly. You breathe in and out less often than you do when you are awake. It is then that the sleepless cells use the food brought to them by the blood to make you grow bigger and stronger.

Healthy Teeth

Strong straight teeth help you to chew your food well. The dentist helps you to take care of your teeth. If he finds any little cavities in your teeth, he fills them before they have a chance to become big cavities. If he finds that some of your second teeth are coming in out of place, he can straighten them. Every boy and girl should go to the dentist at least twice a year.

Brush your teeth at least three minutes night and morning. Brush the teeth in the direction in which they grow. This means that you should sweep the brush downward from the gums when you brush the upper teeth and upward from the gums when you brush the lower teeth.

Roberts



A school dentist spent a week examining the teeth and gums of all the boys and girls in school. He found that about one quarter of the children had soft gums that bled easily. Many more had

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Clean straight teeth
make pleasant smiles

poor teeth. He asked those children who had strong straight teeth and firm pink gums what they had for breakfast. All the children had milk and dark cereal. They had toast or crusty rolls made of whole wheat. They had an orange or a grapefruit or a glass of orange juice or tomato juice. Some of them had a soft-boiled or poached egg besides.

Then the dentist asked the children with poor teeth and gums what they had for breakfast. Many of these children said they did not like milk. They drank coffee instead. They liked to eat white bread and soft sweet buns with their coffee. Some of them said they never had oranges or grapefruit because these fruits cost too much.

These children learned that canned tomatoes are much cheaper than oranges and grapefruit and are just as good for the teeth and gums. They learned that whole-grain bread and cereals are usually about the same price as white bread and buns. The dentist told them that the crusts of bread and hard toast and raw vegetables, such as cabbage and carrots, are good for the teeth because these foods give the jaws exercise and help to improve the circulation of blood in the teeth and gums. The children learned that coffee does not contain any food at all, but that milk is cheap at any price because it contains almost everything that boys and girls need to grow big and strong on. The children asked their mothers to let them have for breakfast the foods that would help them to build strong straight teeth and firm pink gums. Six months later the dentist found that the children's teeth and gums were much healthier.

ARE YOU DOING YOUR BEST TO HELP YOUR BODY TO MAKE GOOD USE OF FOOD?

Do you drink milk at every meal?

Do you eat a dish of dark cereal with milk and some bread made of whole wheat every day?

Do you eat fruit and vegetables every day?

Do you have a helping of meat, fish, peas, beans, or cheese once a day and an egg at least four times a week?

Do you play outdoors in the sunshine on pleasant days?

Do you chew your food thoroughly?

Do you eat your meals at about the same time every day and keep from eating between meals?

Are you cheerful at mealtimes?

Do you wash your hands and face and brush your hair before coming to the table?

Do you eat foods that have been boiled or cooked in the oven instead of foods that have been fried?

Do you rest before eating when you are hot and tired from play and keep from exercising hard right after a meal?

Do you have a regular time each day for a bowel movement and wash your hands with soap and water after going to the toilet?

Do you brush your teeth twice a day and go to the dentist every six months?

1. From the following list choose three foods that are rich in fat, three that are rich in carbohydrate, and three that are rich in protein. Choose two foods that are rich in calcium and phosphorus, two that are rich in iron, one in vitamin A, one in vitamin B, two in vitamin C, one in vitamin D, and one in vitamin G. Choose two foods that contain roughage. Choose two foods that give the jaws exercise. (*Do not write in the book.*)

EXAMPLE. *Foods rich in fat:* butter, nuts, bacon

milk	oatmeal	honey
cheese	lettuce	beans
butter	raw cabbage	lamb chop
canned salmon	cod-liver oil	bacon
beefsteak	toast	grapefruit
eggs	beef liver	celery
stewed prunes	whole-wheat bread	carrots
tomatoes	dried apricots	apples
oranges	white potatoes	
nuts	spinach	

2. Which of the following statements are true and which are false? Reword each false statement so as to make it true. (*Do not write in the book.*)

a. Saliva is the digestive juice found in the stomach.

b. Digested food passes into the blood stream from the small intestine.

c. Material in food which cannot be digested is found mostly in milk, butter, and cheese.

d. The best way to help the bowels to move daily is to take a laxative every morning before breakfast.

e. The waste gas removed from the body through the lungs is carbon dioxide.

f. A poached egg is more easily digested than a fried egg.

g. It is better to jump rope than to play marbles right after a meal.

h. The best night to choose for going to the motion pictures is Friday night or Saturday night.

i. The body cells use food for building and repair mostly during sleep.

j. Every boy and girl should go to the dentist at least twice a year.

k. The teeth should be brushed once a day.

THINK ABOUT THESE QUESTIONS

1. Milk, green and yellow vegetables, fruits, eggs, and cod-liver oil are called protective foods. Do you know why? What are the names of some plants whose leaves are good to eat? whose roots are good to eat? whose fruit is good to eat? What are the names of some citrus fruits?

2. What are some of the wastes that collect in your home? How are these wastes removed? What would happen if they were not removed regularly? What would happen if the ashes were not taken out of the furnace?

What are the wastes made in your body? How do you get rid of each one of these wastes? What happens when you do not get rid of solid waste every day? What are the things you can do to help your body to get rid of solid wastes?

DO THESE THINGS

1. Cows in the United States give about fifty-two billion quarts of milk a year. How many million make a billion? Each year about eighteen billion quarts are made into butter; about two billion quarts are made into evaporated milk; about one billion quarts are made into ice cream; and about two and a half billion quarts are made

into cheese. How many billion quarts of milk are left for drinking and for cooking in the home?

How many quarts of fresh milk does your family use each day? How many people drink milk in your family? Ask your mother how much of the milk is used for drinking and for making milk drinks, such as cocoa, and how much for cooking. Does your family use any evaporated milk? Usually it is cheaper than fresh pasteurized milk and is just as good. One tall can of evaporated milk is equal to two quarts of fresh milk.

2. Plan some healthful meals for one day. Start each meal with milk and dark cereal or whole-wheat bread or crackers. Plan to have in the day's food supply a helping of meat, fish, beans, peas, or cheese; a helping of potatoes, creamed, baked, or mashed; one other cooked vegetable and one raw vegetable; an orange, grapefruit, or tomatoes; one other kind of fruit, raw or cooked; and a simple dessert, such as custard, rice pudding, bread pudding, ice cream, or plain cookies. Your mother may be interested in seeing the meals you plan.

3. You know that you cannot grow plants without water. Plants suck up water from the ground through their roots. To see how the water travels up through the stem of the plant put a stalk of celery in water colored with red ink. Plants lose water through their leaves. Prove this by holding the underside of a geranium leaf against a cool windowpane. Notice the moisture left by the leaf on the glass. How much of your weight is water? What foods contain a great deal of water? What are the ways in which your body loses water? How do you make up this loss?

4. Make a list of some of the things you can do for about half an hour after lunch or dinner that will make it possible for your stomach to begin its share of the work of digestion.

5. Find out which parts of the world lead in the growing of the following grains: wheat, oats, rye, corn, rice. Can you explain why food is sometimes spoken of as "our daily bread"? What raw materials do grain foods supply?

6. Choose one fruit, such as apples, oranges, bananas, or pineapples, and find out which parts of the world lead in the growing of that fruit. What food materials does the fruit supply?

Look up the history of the fruit you have chosen. In what country did people first learn that it is good to eat? When and how did it become known to the people of other countries?

7. Find out how cod-liver oil is made. What food materials does cod-liver oil supply?

8. Read the story of Ceres and Proserpina called "The Pomegranate Seeds" in *Tanglewood Tales*, by Nathaniel Hawthorne. The people who lived long ago in the city of Athens in Greece made a play of the story of Ceres and Proserpina and acted it every year on a special holiday. The play is supposed to explain the growth of plants from seeds dropped into the ground and the changes of the seasons. After reading the story see if you can answer these questions: What does Proserpina stand for? What does her mother Ceres stand for? What does the time which Proserpina must spend underground stand for? What does her return to earth mean?

WORD STUDY

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

vitamins	phosphorus	digestive juice
laxative	calcium	saliva
raw material	lime	small intestine
carbohydrates	mushroom	oxygen
whey	roughage	carbon dioxide
protein	bowel	bladder
curd	pasteurized	kidneys
sugar cane	citrus fruits	urine
mineral salts	fish-liver oil	

2. Match each group of words in the list below with the word or words in the list above that you connect with it. (*Do not write in the book.*)

materials in food that have letters of the alphabet for their names
coarse material in food that cannot be digested
sugars and starches
body-building material
calcium and phosphorus
oranges and grapefruit
a digestive juice
a gas necessary for life
body organs that remove liquid wastes from the blood

UNIT IV

The Eyes

Near a cave by a river a boy sat with pencil in his hand and a pad of paper on his knee. In and out of the cave darted a pair of phoebe birds. The boy's bright eyes followed the flicker of their wings as they chased insects in the sun.

The boy watched other birds darting over the river. He tried to draw them just as they looked, on the wing or holding tight with their tiny claws to a tree branch.

The boy had come to America from France. In France too he had wandered through the meadows watching birds and trying to make pictures of them. When he came to America he came to a country where both the Indians and the white men had trained their eyes to see faraway things clearly. The boy found that his eyes were as good as the eyes of any of these men. He could see birds several hundred feet away and note their colors.

The name of this boy was John James Audubon. When he grew to be a man his bird pictures made him famous. Audubon's bright eyes took true pictures of the birds. His brain held the pictures for him while his fingers drew them on paper for other people to see.

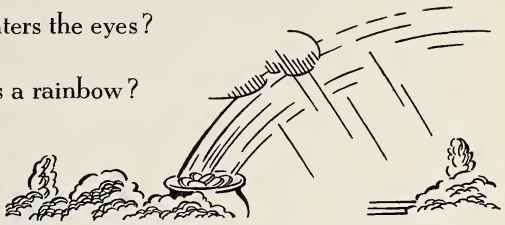
Not many people can draw beautiful pictures, but everyone who can see takes pictures with the eyes and stores the memory of them in the brain. Most of the things we learn about the outside world we learn through our eyes. The ones who learn the most are the ones who are making the best use of the eyes with which they were born.

DO YOU KNOW

What gives your eyes their color?

How light enters the eyes?

What makes a rainbow?



How the eyes take pictures?

What it means to be blinded by light?

How far away you should hold your book when you read?

Why some boys and girls wear glasses?

Why the invention of printing made spectacles important?

Why a good citizen does not throw sand or snowballs at people?

What "the seeing eye" means?

How the discovery of germs helped people to take better care of their eyes?

Look closely at your eyes in a mirror. Two openings, like buttonholes, appear to be cut in the skin of your face. Your eyes are placed in these openings. In each eye there is a colored glassy circle with a smaller black circle in the center. The colored circle seems to touch the top and bottom edges of the opening in which the eye is placed. But if you pull first the lower lid and then the upper lid gently away from the eye, you see that the colored circle is set in a milky white surface which is curved like a ball. If you hold a ball in your hand, you see only part of the ball. The eye is shaped like a ball, and you see only the front curve because the rest of the ball is set back in the head. If you hold a ball in your fingers, you can turn it in different directions by moving your fingers. The eyeball is held in the head and turned in different directions by muscles fastened to it.

The Window of the Eye

The glassy circle set in the front curve of the eyeball is the window of the eye. Back of the window there is a colored shutter called the iris. The color of the iris shining through the window gives your eyes their color. Some people have a blue shutter in their eye windows; others have a brown, or a gray, or a hazel shutter. The iris, or shutter, of the eye covers only part of the glassy window. The part it does not cover is the hole in the center. This hole is called the pupil. Light enters the eye through the pupil.

"
John James Audubon
had bright ey

Sit for a while in a room in which the light is very dim. Then turn on the light and look quickly into a mirror. Notice that the black hole in the center of the eye rapidly becomes smaller. When the light is bright, muscles in the iris draw in the shutter around the pupil to make it smaller so that too much light will not enter the eye. When the light is dim, muscles pull back the shutter so that more light can enter the eye. Light shining in through your eye windows is what makes it possible for your eyes to take pictures of people and things in the outside world.

Chasing Rainbows

Have you ever played with a prism? A prism is a three-cornered piece of white glass. More than two hundred and fifty years ago a great and wise man played with a prism. His name was Sir Isaac Newton. Newton held his prism in the path of a sunbeam. And lo, a perfect little set of rainbow colors fell at his feet. Until then people had believed that all light was white. They thought they could make it colored only by letting it shine through colored glass. But here was a white beam of sunlight passing through a white prism, and coming out were all the colors of the rainbow—red, orange, yellow, green, blue, indigo, and violet. What had the prism done? It had split the sunbeam into the rays of which it was made up.

A beam of white sunlight is a bundle of colored rays. A prism sorts out all the rays of the same color. When light passes through a prism, you see bands of several different colors. The colors mixed together make white.

"
The neighbors laughed to see Sir
Isaac Newton blowing bubble
What was he really doi

A rainbow is formed by raindrops which act as little prisms. The raindrops break up sunbeams into their different colors and then reflect them down to earth. Light shining through a spray of water from a rubber hose or on a dewdrop or a soap bubble is often broken up into colors.

Newton used to sit in his garden and blow soap bubbles. This made the neighbors laugh. "See that silly man blowing bubbles," they said. If they had known what he was doing, they would have laughed even harder. People say a person is "chasing rainbows" when he is doing something foolish. Newton really was chasing rainbows. He was trying to find out why white light striking the bubbles made such lovely colors. What he learned about light and color was his first great discovery.

Reflections

When light strikes something through which it can travel, we call that thing transparent. Glass is transparent. The window of the eye is transparent. The inside of the eyeball is filled with material that is transparent. But most things do not let light pass through them. Light rays striking things which are not transparent are reflected. That is, they are turned back. When you look in a mirror, the glass reflects a picture of you to your eyes. It does this because the back of the glass is coated with something through which light cannot pass. The moon reflects the light of the sun. Only a few things, such as the sun, lamps, candles, and fire, shine by their own light. Everything you see that does not make its own light reflects light. If it did not reflect light, you could not see it.

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Playing with a prism
to make the colors of the rainbow

KODACHROME BY STEVEN A. COONS

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Different things have different colors because of the color of the light rays that each thing reflects. Grass looks green because only the green rays in sunlight are reflected. A red dress looks red because only the red rays are reflected. A white surface reflects almost all the rays.

How You See

In the dark not only do we have no light but we do not even see the things around us. We should not know they were there if we could not feel them or smell them or hear them or remember them. You know that now it is light because you are reading this book. You see the page because light rays reflected from the page pass through the pupils of your eyes. The light rays travel right through the transparent part of the eye until they reach the back. At the back of the eye there is a very thin film called the retina. Light rays reflected from the page make a tiny picture of the page on the retina just as light rays reflected from you make a picture of you on a camera film.

Now you know very well that a camera cannot look at a picture it has taken and say: "My, what a fine-looking boy!" or "Hasn't Margaret grown tall since the time I last took her picture!"

The eye is simply a living motion-picture camera that takes pictures. But when you look at a picture taken by a camera, you recognize the things and the people in the picture. You know that a tree is a tree and that a house is a house and that the boy or girl standing by the tree in front of the house is you. You recognize the things you look at with the thinking part of your brain. Nerves that

are spread out in the retina send to your brain thousands of messages that describe the pictures the eye camera takes. The brain recognizes the pictures.

Without light there would be no use in having eyes. Without eyes you could not take pictures of people and things in the world about you. Without a brain you could not recognize the pictures the eyes take. Light, eyes, and the brain together give you the wonderful gift of sight.

MAKING THE MOST OF YOUR EYES

If you break or lose a camera, you can buy a new one. But all the money in the world will not buy you a new pair of eyes if the ones you have are hurt so badly that they cannot take pictures.

There was once a very rich man who was going blind. He said, "A million dollars to the doctor who will give me back my eyesight."

What makes it possible for you to know
that you are looking at a picture of two eyes?
Galloway

A million dollars is a great deal of money. Anyone would be glad to earn it. But good eyesight is something that you would not sell and could not buy for a million dollars. How can you guard a treasure so precious that it may neither be bought nor sold?

The Eyes and Light

Have you ever been blinded by light for a few seconds? This sometimes happens when you turn on the light in your bedroom in the middle of the night or when you go suddenly from a dark room into a brightly lighted room. In the dark the eye shutters are drawn back from the pupils. They cannot make the pupils smaller quickly enough when a sudden bright light strikes the eyes. Therefore, too much light enters the eyes and for a few seconds you may be blinded by the light. This means that you cannot see anything except light.

Your eyes may be blinded by trying to look at the sun or by bright sunlight reflected from sand or from a white road or from snow. You may not be able to read print when bright sunlight or lamplight falls directly on the shiny white paper of a book or on a blackboard. No one can see without light, but a bright light shining directly into the eyes or reflected into the eyes from a shiny surface makes it impossible for the eyes to take clear pictures.

Never try to look at the sun except through smoked glass. In walking along a road at night try not to look directly into the headlights of automobiles. When you go to the seashore in the summertime or go for a long walk over snowy fields on a bright winter day, it is a good

idea to take dark glasses with you in order to protect your eyes from the glare of light on the sand or snow.

When you use your eyes for close work, the light should be strong and steady enough so that you can see clearly what you are looking at. Sometimes people read in a room which is dark except for one light shining on the page of the book. Very few people keep their eyes glued to the page every second. They look up at least when they turn a page or when they stop to think about what they are reading. If all the room is dark except for a light on the book, the muscles in the eye shutters must work every time the reader looks up and every time he begins to read again. This extra work strains the muscles of the eyes.

The whole room should be lighted when you read or sew or draw or do other close work. The lamps used to light a room should throw the light toward the ceiling. Light reflected from the ceiling fills the whole room with light. The light from the reading lamp should shine directly down on the book.

Keeping the Eyes from Working Too Hard

The eyes do not need to work hard to see things twenty feet or more away. But to see near-by things clearly and especially things so close that you can hold or touch them with your hands, your eyes must work hard. This is why it rests the eyes to look off into the distance now and then when you are reading, writing, or sewing. Since the eyes must work to look at ordinary things close by, you can imagine how hard they must work to see tiny things.

Dark glasses protect the eyes from the glare of sunlight on sno

Galloway

Fine print is very hard on the eyes. Books with large print and short lines and plenty of white space between the lines are much easier to read than books closely printed in small letters. When you are reading a book, your eyes can do their best work if you sit up straight and hold the book about fourteen inches away.

In reading or in looking at a landscape the eyes jump sideways in little hops. If you watch closely the eyes of a person who is reading, you will see how his eyes jump from one word to the next and then back again to the beginning of the line.

We use our eyes mostly to look straight ahead, or down, or from side to side. We do not often look up. It tires the eyes to look up for a long time. This is why, when reading in bed, you should prop up your head and shoulders so that you can hold the book on a line with your eyes. When you go to the motion pictures, do not sit so close to the screen that you have to look up all the time or so far away that you have to strain your eyes to see the pictures.

It also tires the eyes to look at things in a light that flickers. How should you like to hop across a brook on stepping stones that jiggle? You ask your eyes to move in little hops on words that jiggle when you read on a train or in an automobile or in a flickering light.

OVERCOMING EYE FAULTS

There was once a little girl who lived on the bank of a river. She used to hear people talking about things they could see "across the river."

"Come, Julia, and see the rainbow across the river," her father called after a late-afternoon rain.

"How beautiful the colors are in the trees across the river," her mother said.

"I counted seventy cars in that freight train going along across the river," her brother boasted.

"Look, Julia, the geese are flying north across the river," her grandmother said. "It will be an early winter."

Julia wondered what "across the river" meant. She never asked. She only smiled when people talked about "across the river." She knew it was where the sun rose. She could see the light of the sun. It was where the moon rose, but to her the moon was only a smear of soft light.

Then Julia went to school. The teacher wrote on the blackboard, but Julia could not see what the teacher wrote. She had to hold her book close to her eyes when she read.

One day the teacher examined the eyesight of all the children. She had a chart with letters printed on it. At the top of the chart the letters were large; at the bottom they were small. The teacher made a chalk mark on the floor twenty feet away from the chart. The children in the class took their turns in standing with their toes touching the chalk mark. The teacher gave each boy or girl a card to hold over one eye. Then the teacher asked each one to read the letters on the chart beginning with the top line. Each eye was tested in this way.

When Julia's turn came, she could not see the letters in the bottom line. Even the big letters at the top of the chart were not clear. The teacher said that Julia must have her eyes examined by an eye specialist. An eye specialist has made a special study of the eyes.

Why could not Julia see clearly the big letters at the top of the chart?

"

Julia's mother took her little girl to the eye specialist. The eye specialist examined Julia's eyes with great care. He said she was very nearsighted. This meant that Julia could see things if she held them close to her eyes, but she could not see faraway things clearly. The eye specialist had glasses made for Julia.

When the glasses came, Julia put them on. How clear everything looked. She could see separate leaves on the trees in front of her house. She could see birds hopping on the lawn. Most wonderful of all, she found out what "across the river" meant.

In many schools the pupils' eyes are tested every year. Boys and girls who do not do good school work often cannot see very well. As soon as they begin to wear glasses, their work improves, they have more fun, and they can see more clearly all the interesting things about them.

Spectacles and Books

No one knows when eyeglasses were invented. As nearly as we can learn, the people of China were the first ones to make and wear spectacles. Roger Bacon, a man who lived about seven hundred years ago, described in his writings "the little glasses which cause small letters to appear large." But people did not pay much attention to Roger Bacon. Most people in those days used their eyes only in daylight. The only "books" many of them had were the little picture stories cut in stone and painted on the glass windows of their great churches. They loved to listen to stories told by wandering storytellers.

All the books were written by hand, and each book meant the work of months and perhaps years. Very few people could read the books or afford to buy them. Then, about fifty years before Columbus discovered America, a man named John Gutenberg is said to have invented printing.

With the invention of printing it became possible to make hundreds of copies of a book in a single day. Books became much cheaper. Even poor people could afford to buy one or two books. The invention of printing, however, brought it about that a great many persons used their eyes for hours at a time to look closely at little black letters running across a white page.

The eyes of many people could not stand the strain. These people turned to glasses to help their eyes in reading all the wonderful thoughts that had been stored in books. Much later the invention of electric lights turned the darkness of night into the brightness of day. The

After *Hygeia*

A picture story of spectacles:

a, the first "spectacles," made in the thirteenth century, were a single glass lens set in a frame of wood; *b*, spectacles like these were worn in the fifteenth century; *c*, later, spectacles were held in place by bows which pressed against the head in front of the ears; *d*, in the eighteenth century ear strings, hung over the ears, were used to hold spectacles in place; *e*, this is the kind of spectacles that George Washington wore; *f*, a special kind of spectacles, which can be used to see both near-by things and distant things was invented by Benjamin Franklin

time in which people could read comfortably was greatly lengthened. Motion pictures were invented. Today there are many ways in which the eyes may be strained. It is as important for schoolboys and schoolgirls to learn how to take care of their eyes as it is to learn the things that they can find out only by using their eyes.

Do you wear glasses? If so, you wear a seeing help that has changed the whole world for thousands of people. Many boys and girls have learned, as Julia did, that glasses help them to see things which they had once known only by hearing about them.

Glasses deserve good care. If you wear glasses, do you keep them clean? Do you place them with the bows down when you take them off, so as not to scratch the glass?

PROTECTING THE EYES FROM HARM

Look at your eyes again in a mirror. Notice how they are placed in the head. Above the eyes there is a strong arch of bone called the forehead. Each eye is guarded on one side by the bones of the nose and on the other side and below by the cheekbones. The eyes are walled in, in all directions, by bone. The bony walls can break the force of any blow except a blow from a sharp-pointed instrument which directly enters the eye.

Above each eye there is a line of hair called the eyebrow. The eyebrows and the eyelashes which rim the eyelids help to keep perspiration from entering the eyes. The eyelashes also act as screens to keep out dust, and, when touched, they signal to us to close our eyes.

The eyelids are very strong. They have on the underside a hard material which protects the eyes when the eyelids are drawn down over the eyes. If a ball or some other object is thrown unexpectedly toward your face, your eyelids close quickly.

Tears keep the eyes moist and clean. They flow across the eyes from little bags located above the outer part of

the eyeballs. They are carried into the nose by tiny tubes which begin at the inside corner of the eyes. You can easily see the mouths of the tubes that drink up the tears if you look closely at the edge of your lower eyelids toward your nose. When you cry or when you get something in your eye, so many tears are made that the little tubes cannot hold them all. The tears then overflow their banks and run down the cheeks.

The best thing to do when a bit of dirt or a cinder gets into the eye is to let the tears wash it out, if possible. If the tears cannot do this, ask an older person to take you to someone who knows how to remove things from the eye. Rubbing the eyes may grind the dirt into the eyeball. Poking into the eye with the sharp corner of a handkerchief may scratch the eyeball or may put germs into the eye.

Many boys and girls have had their eyes badly hurt by sand or dirt thrown by careless playmates. Are you a good citizen? A good citizen is as careful of the health and safety of his neighbors as he is of his own health and safety. A good citizen does not throw sand, stones, hard snowballs, or other things directly at people. He does not play with shooting toys, such as a bow and arrow, when people are in the way.

The eyes have no protection against sharp-pointed things, such as sticks, knives, and scissors, when they strike the soft eyeball. You cannot know when you may stumble and fall while you are running. This is why it is dangerous to run while you are carrying something which has a sharp point. Do not take the risk.

Howard with Prince Charlie, his "seeing ey

The Seeing Eye

The Seeing Eye

Fred, Dan, and Howard were taking a walk. Howard had a wonderful dog. His name was Prince Charlie; but Howard called him Prince, for short. Prince came from a place managed by a society called The Seeing Eye. Howard had stayed with Prince in this place for six weeks. He and Prince had learned to love each other and to work well together.

As the three boys walked along the street, Howard kept hold of Prince's harness with his left hand. When the boys came to a busy street corner, Prince stopped. The policeman at the crossing blew his whistle and held up the traffic. Then Prince trotted across the street in front of Howard. After they had crossed the street, Howard leaned over and patted Prince. "Good dog," he said. Prince wagged his tail and looked very proud of himself.

Howard is blind. Prince is his "seeing eye." Prince goes everywhere with Howard. He has been trained to stop whenever he comes to a place where Howard must cross a street or step down or step up or go around something. Prince obeys the traffic rules much better than many people do. He is a friend to all the policemen in town.

"I wish I had a dog like Prince," said Fred, when he and Dan had left Howard.

"I'd rather have my own seeing eyes," said Dan.

While setting off fireworks, Howard had lost his eyesight the year before just after he had graduated from high school. A big skyrocket had exploded when Howard was trying to light it. The burning powder had put out his eyes.

Fireworks are much pretti
when seen from a dista

Gendreau

Fireworks may injure the eyes by throwing burning powder or tiny stones into the eyes when they explode or by making too bright a glare when they are seen close by. Many towns and cities forbid the sale of firecrackers, torpedoes, cap pistols, and other fireworks to boys and girls. To celebrate a holiday, firecrackers are sometimes set off at night in city parks by men hired for the purpose. Care is taken to protect the safety of the people who come to see the fireworks. They are not allowed to come too close to the field where the fireworks are being set off. Fireworks are much prettier and cannot hurt the eyes when they are seen from a distance.

Old and New Ways of Caring for the Eyes

You have learned that up to seventy-five years ago no one knew anything about germs. Very often a newborn baby had germs in his eyes that made him blind in a day or two. People thought these babies had been blind from birth. Nowadays the doctor or nurse puts medicine drops into a baby's eyes as soon as the baby is born. The drops kill the germs. Ask your mother if you had drops put in your eyes when you were born.

People's eyes were often injured in war in the old days or put out as a punishment for even small crimes. Almost every eye injury was followed by blindness, as all sorts of unclean greasy medicines, called ointments, were rubbed on the eyes.

There are people today who think that magic words or the water from certain springs or greasy mixtures of different kinds will help the eyes. But most of us know that

doctors are the only ones who can tell what to do for sore eyes or for eyes that cannot see well.

We know also that nothing unclean must ever touch the eyes. This means that you must never touch your eyes with unclean fingers or with an unclean handkerchief. Wash around your eyes only with your own clean wash-cloth, and dry your face only with your own clean towel. Never use any sort of medicine or ointment for sore eyes unless a doctor has told you to do so. If the eyes become red and swollen and matter runs from them, ask your parents to take you to a doctor at once. Do exactly what the doctor tells you to do.

ARE YOU DOING YOUR BEST TO TAKE GOOD CARE OF YOUR EYES?

Do you read or do other close work with a strong steady light shining down on your book?

Do you read only when you are sitting up?

Do you hold your book about fourteen inches from your eyes and on a line with your eyes?

Do you protect your eyes from glaring light?

Do you keep from reading books or magazines that are printed in fine print?

Do you keep from reading on trains or busses and in a flickering or dim light?

Do you use sharp-pointed tools with skill and avoid running with sharp-pointed things in your hands?

Have you made it a rule never to shoot fireworks or play with guns?

Have you made it a rule never to throw sand or dirt or anything else at people?

Do you keep your fingers away from your eyes?

Do you wash and dry your face only with your own clean washcloth and towel?

Do you have your eyes examined by a doctor every year?

If you wear glasses, do you keep them clean and free from scratches?

1. Complete the following sentences by supplying the missing word or words. (*Do not write in the book.*)

a. The eyeball is turned in different directions by __?__ fastened to it.

b. When the light is bright, the __?__ makes the __?__ of the eye smaller.

c. Light enters the eye window through the __?__.

d. A beam of white sunlight is a bundle of __?__ of different __?__.

e. We see things that do not make light because they __?__ light.

f. Pictures taken by the eye are recognized in the__?__.

g. __?__, __?__, and the __?__ together give us sight.

h. The __?__ keep perspiration from running into the eyes.

i. The __?__ close quickly when the eyes are in danger.

j. __?__ keep the eyes moist and clean.

2. Tell what you think of when you see each of the following groups of words and names:

EXAMPLE. *A good reading light:* light that comes from above and behind the chair

a good reading position
a page of print that is easy to read
the way in which a book should be held while one is reading
dark glasses
nearsightedness
eye specialist
Sir Isaac Newton
Roger Bacon
John Gutenberg
a good citizen
The Seeing Eye
ways of protecting the eyes from germs

THINK ABOUT THESE QUESTIONS

1. How many senses do we have? What are their names? Which sense is used most in learning about things in the outside world? What do your eyes tell you about things?

2. Why is it very difficult for you to see in the dark? What senses do you depend on when it is necessary for you to find something or to go somewhere in the dark?

3. What are some of the ways in which the eyes may be strained? What are some of the signs of eyestrain? What are the things you can do to keep from straining your eyes?

4. What are some of the causes of accidents to eyes? How is the eye protected from injury? What may you do to protect your own eyes and the eyes of others?

DO THESE THINGS

1. Read the story of Theodore Roosevelt. How was his life changed by the wearing of glasses? What other things did he learn to do to take care of his health when he was a boy? It would be interesting to start a class scrapbook of newspaper and magazine pictures of great men and women who wear glasses.

2. Find out about the eyes of different animals. The crab, the bat, the owl, the mole, the cat, the eagle, and the bee have very interesting eyes. The class may be divided into groups, and each group may learn about the eyes of one creature and then report to the class. In making this study some of you may find out the reason for the bright colors of some flowers and birds. If you

like to write stories, you may write a description of the world as a bee or a mole or some other creature sees it.

3. The six pairs of colors that are seen most easily at a distance are, in the order named:

1. Black on yellow
2. Green on white
3. Red on white
4. Blue on white
5. White on blue
6. Black on white

Make a poster on eye safety, using one of these pairs of colors.

4. Which of your textbooks is the most pleasing in its make-up? Why is it the most pleasing?

5. Draw from memory a picture of your school building. Then draw a picture while you are looking at the building. Compare the two pictures. How good is your memory of the things you see?

WORD STUDY

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

invention	prism	film
beam (of light)	reflection	eye specialist
rays	retina	ointment

2. Choose a word or words from the list of words above to complete each of the following sentences:

a. Jim bought a new __?__ for his camera.

b. The printing press was a great __?__.

c. Paul went to an __?__ __?__ to have his eyes examined.

d. Alice saw her __?__ when she looked into a clear pool of water.

e. A __?__ of light passing through a __?__ is split up into different colored __?__.

UNIT V

The Ears

The eyes can see much farther than the ears can hear. You may see blue hills lifting their heads above the horizon many miles away, but you cannot hear birds singing in the trees on the faraway hills. In the old days, when all news was spread by word of mouth, people could see the messenger coming from far off long before they could hear his voice.

For thousands of years news came to most people through their ears. The town crier with his bell read the news aloud in the village streets of New England. Men and women and boys and girls gathered eagerly about the returned traveler to hear about the happenings in lands far away. Then came the newspaper, and people began to depend more on their eyes than on their ears to learn about what was going on in the world. But now the radio has given new importance to the speaking mouth and the listening ear. Once a man could talk only to people who were near by. Now he can speak to millions of people far away. Now an orchestra plays, and people all over the earth may listen.

People have always been hungry for news about things that are happening beyond reach of their eyes and ears. But they must *live* in their own little world. This world is where they happen to be. From the world that surrounds each one of us our ears are always bringing us news. Each sound we hear can tell us something if we will only listen to it and have ears open to its message. Making the most of our ears is one of the principal ways of making the most of ourselves.

DO YOU KNOW

Why there is probably no sound on the moon?

What a sound wave is?

What your eardrum is?

How the inside of the ear connects with the outside world?

Why a cold may cause earache?

What an ear specialist is?

Whether a boy or a girl may not hear well and not know it?

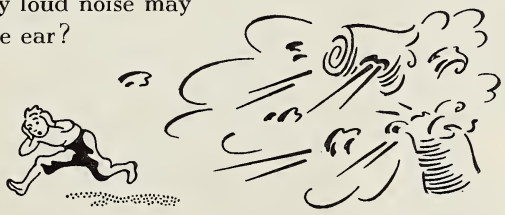
What an audiometer is?

Why you have tonsils?

How to breathe while swimming?

Why you have yellow wax in your ears?

How a very loud noise may injure the ear?



Why you should not strike anyone on the ear?

SOUND WAVES

You know that the earth is surrounded by air. If there were no air, there would be no sound. There is no air on the moon; so the moon is probably a silent world.

Sound is carried along through the air in little waves. Have you ever thrown pebbles into a pool? If so, you know that waves spread out from the place where the pebble struck the water. The pebble striking the water set the water in motion.

When anything is struck, it quivers, or vibrates. To quiver, or vibrate, means to move rapidly back and forth. A thing that vibrates sends sound waves out into the air. Things which are perfectly still do not send out sound waves. Two glasses standing side by side on a table are silent. But if you strike one glass against the other glass, you hear a ringing noise. A violin and a violin bow are silent apart; but when the bow is drawn across the violin strings, the strings vibrate and beautiful sounds are heard. Water in a brook makes a noise when it strikes against the stones in its path.

Moving air makes things vibrate. No sound comes from a tree when the air is quiet. But when a wind blows through a tree you hear the sound of the leaves rustling against each other. The sound of your voice is made when air breathed out from your lungs shakes little cords of thin skin stretched across your windpipe.

Each sound wave sent out by a thing that vibrates does not move very far. Probably you have played with dolls that had weights at the bottom. When you hit such a doll, it swayed to and fro; but it did not

" ten! The town crier is reading the news

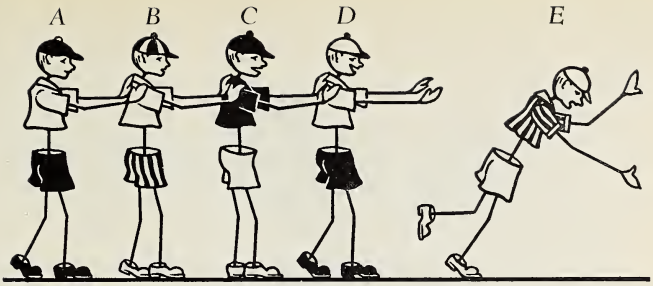
move far from the place where it stood. Now suppose you have five such dolls, called A, B, C, D, and E, standing close to each other in a row. You give A a push. A pushes B and straightens up again. B pushes C, C pushes D, and D pushes E. Each doll after passing along the push becomes erect. You could send along a push through a fairly long row of dolls, each doll, however, only swaying to and fro. In this way sound is sent through the air.

This explanation of the way sound is carried along was first given by John Tyndall, a great scientist who lived in the nineteenth century. Tyndall tells us to think of boys

"

Only when the player makes the strings
of his violin vibrate do we hear sounds from the violin

Roberts



A sound wave travels through the air as a push may be passed along by a row of dolls. If E, in falling forward, should strike a drum, the drum would vibrate just as the eardrum vibrates when a sound wave hits it

standing in a row and passing along a push. The picture above shows figures, or dolls, to represent boys.

Now suppose a drum is placed within reach of the last doll in line and all the dolls are facing toward the drum. When the last doll is pushed from behind, it will sway forward and strike the drum, and the drum will quiver, or vibrate. This is what happens when you hear a sound.

Over the lower end of the tube leading down into your ear from the outside a thin skin is stretched. This skin is called the eardrum. It is something like the skin which covers the top of a big drum, only it is much thinner. When a sound wave strikes the eardrum, the drum vibrates, just as the skin covering a real drum vibrates when it is hit. When the eardrum vibrates, the news of that motion is sent up by the hearing nerves to the brain. The brain receives the news and tells you what kind of sound waves struck the eardrum.

Every sound has its own waves, which are different from the waves made by every other sound. This is why

different things make different sounds. You can tell a cry from a laugh because a cry sends out waves into the air that are different from the waves sent out by a laugh. Laughing sounds and singing sounds and the sounds made by a low pleasant voice are sweeter to hear than whining, loud, and unpleasant sounds. Are you training your voice to send out sound waves that people like to hear?

By means of waves in the air all sound messages come to our ears from the outside world. We become hard of hearing and are shut out from the world of sound if our ears cannot carry to the brain the news which the sound waves bring them. The air is full of messages for us traveling along in waves. We get just as many of these messages as our ears are able to receive and our minds to understand.

How the Inside of the Ear Is Connected with the Outside World

Sound messages are carried from the eardrum across a tiny space called the middle ear. The middle ear leads into another room, shaped like a snail shell, called the inner ear. Here the hearing nerves are located.

The middle ear is filled with air. How does the air get there? Certainly not through the outside part of the ear, because that is closed at the lower end by the eardrum. A narrow tube leads from the middle ear to the back of the throat close to the place where the nose opens into the throat. This tube is called the Eustachian tube in honor of an Italian doctor who discovered it. Air enters the ear through the Eustachian tube. It is the only open road leading from the outside world to the inside part of the ear.

Find the parts of the ear in the drawing above the boy's head as you read about them

You may wonder why it is necessary to have air in the middle ear. The reason for this is that the eardrum cannot quiver, or vibrate, properly unless it has air on both sides of it. Air has weight. If the weight were all on the outside of the eardrum, the eardrum would be pushed in. It would not be stretched tight enough to send clear sound messages to the brain. A string stretched tight makes a humming sound if it is pulled with the finger. A loose string does not shake rapidly enough to send out sound waves which you can hear when it is pulled.

Have you ever noticed that you do not hear so well as usual when you have a cold? It sometimes happens that the opening of the Eustachian tube swells and shuts when a person has a cold. Air cannot then pass easily into the middle ear, and the hearing becomes dulled.

MAKING THE MOST OF YOUR EARS

Dorothy had scarlet fever. When the doctor came to see her, he always looked into her ears.

"Why do you look in my ears," Dorothy said one day when she felt better. "Have my ears got scarlet fever?"

"Certainly they have," said the doctor. "You've got scarlet fever all over. Why do you suppose I won't let you read? It is because your eyes have scarlet fever. When a person is sick, he is sick all over from his head to his toes. When I put this little instrument into your ear and look into the instrument with a bright light, I can see your eardrum. By the way your eardrum looks I can tell whether the scarlet fever is doing your ears any harm."

"How do my eardrums look?" asked Dorothy.

"They look fine," said the doctor. "But when you are well, I want your mother to take you to an ear specialist. He is a doctor who has made a special study of the ears. He will find out whether the scarlet fever has hurt your hearing."

"I don't think it has," said Dorothy. "A pair of wrens live in the little house we put up under the porch roof this spring. I can hear them singing just as well as I could before I had scarlet fever."

"I'm glad of that," said the doctor. "We're going to look after your ears so well that they can always hear birds singing."

Protecting the Ear from Infection

You know that the air you breathe in through your nose passes down into the back of your throat on the way to your lungs. The nose opens into the throat close to the Eustachian tube, which runs to the middle ear. When you have a cold or some other sickness caused by germs, such as measles or scarlet fever, germs from your nose or throat may pass into the middle ear through this tube. This is more likely to happen if you blow your nose hard. The thick yel-

Keystone

Blow gently

low liquid which comes from your nose when you have a cold is called mucus. The mucus contains germs. If you blow your nose hard, you may force a tiny bit of the mucus up through the tube into your middle ear. You cannot blow your ear to get the mucus out.

The right way to blow your nose is first to cover your nose with your handkerchief and leave both nostrils, or nose openings, wide open. Then blow gently to clear the nose of mucus. If germs get into the warm dark little room of your middle ear, they may begin to grow in numbers. When this happens, the ear is said to be infected. If you have ever had an infected cut, you know that a thick white matter called pus formed in the cut. Pus forms in the middle ear when the ear is infected. The pus pressing on the eardrum makes the ear ache. It may press so hard that the eardrum breaks and pus runs out of the ear. Sometimes this is called a "running" ear.

If you ever have an earache, ask your parents to take you to a doctor. The doctor may find it necessary to cut a little hole in the eardrum to let out the pus. But the hole that the doctor makes is a clean small hole made with a clean instrument; this tiny cut will heal quickly and properly. The hole made if the eardrum breaks of itself may be a large opening with rough edges that will not heal over properly. Sometimes it is not necessary for the doctor to make a hole in the eardrum if a person with an earache goes to him promptly.

Injury to the eardrum caused by infection of the middle ear may make the eardrum thick or stiff. Then it cannot quiver so well when the sound waves strike it, and part of the sense of hearing may be lost.

How Well Can You Hear?

Loss of hearing is like a thief in the night. It creeps up on people before they realize what is happening. This is why the hearing of boys and girls is tested every year in many schools.

"I don't know what's the matter with our teacher," Kenneth said one day at the supper table.

"Why, I like her," said his sister Edith. "I had her last year. I thought she was a fine teacher."

"I can't hear what she says half the time," said Kenneth. "She mumbles her words."

"

These boys and girls are having their hearing tested with an audiometer. Have you had your hearing tested in this way?

Paul Parker and the New York League for the Hard of Hearing

"She does not," said Edith. "She speaks very clearly."

"That's what *you* think," said Kenneth unpleasantly.

"Stop quarreling," said Father. "You probably don't pay attention to what Miss Allen says, Kenneth. I've noticed lately that you don't listen very well to what I say."

"He says 'What?' all the time," said Edith. "The boys at school are beginning to call him 'What-not.' "

The next day the teacher used an audiometer to test the hearing of all the pupils in the class. An audiometer is a machine, or instrument, used to measure the hearing. The teacher gave each boy and girl a headphone. The headphone had a receiver for one ear. Each receiver was connected by a wire with the audiometer. In the audiometer was a "record" similar to a talking-machine record.

"Write all the numbers you hear through the receiver," said the teacher.

The teacher turned on the "record," and the boys and girls wrote the numbers which they heard. At first the numbers were spoken loudly; then in a lower voice. Each ear was tested in this way. Miss Allen looked at all the numbers which each boy and girl had written on a printed sheet of paper. Kenneth and two other pupils had not written down all the numbers correctly.

After the hearing test Miss Allen said: "Kenneth, Edward, and Carol cannot hear so well as the rest of you can. They cannot hear all the questions I ask them. They cannot hear everything the other boys and girls say to them."

"But why didn't they tell us they couldn't hear well?" said Perry.

"They didn't know it themselves," said Miss Allen. "I'm going to write notes for Kenneth, Edward, and Carol

to take home. The notes will ask their parents to take them to an ear specialist for a thorough ear examination. Very often it is possible to help boys and girls to get back some of their hearing if they go to an ear doctor soon enough. The doctor may also be able to keep them from losing any more hearing. Now can you think of anything we can do to help Kenneth, Edward, and Carol to hear better?"

"I should think they could hear what you say better if they sat near the front of the room," said Eleanor.

Perry, Eleanor, and George had seats near the front of the room. They gave them up to the three pupils who could not hear well.

"I'm sorry I called you 'What-not,'" Perry said to Kenneth.

"That's all right," said Kenneth. "I felt like calling *you* a mumble-bug."

"

This girl has just had scarlet fever.
Why is she having her ears examined by an ear specialist?

Works Progress Administration for the City of New York

Tonsils and Adenoid

Kenneth's mother took him to an ear specialist. The specialist said that Kenneth's tonsils and adenoid should be removed. The doctor explained why diseased or enlarged tonsils and adenoid may cause loss of hearing. This is what Kenneth learned about the tonsils and adenoid:

The tonsils are at the back of the throat. There is one on each side of the throat. These are called the throat tonsils. There is one at the base of the tongue. This is called the tongue tonsil. There is still another on the back wall of the throat. This is usually called the adenoid, or nasal tonsil. The tonsils are near the throat openings of the nose and the throat openings of the tubes which lead to the ears. Their job is to catch and destroy germs. But sometimes they are obliged to work so hard, if a person has one cold after another, that they become too large or diseased. When the tonsils or the adenoid are too large, they may block the ear tubes and cause hardness of hearing. The poisons from diseased tonsils or a diseased adenoid may make the whole body sick. They also may cause ear troubles which lead to loss of hearing. This is one of the reasons why it may be necessary to have the tonsils and the adenoid removed when they are too large or infected.

How to Breathe When Swimming

Do you know how to swim? Swimming is one of the finest of all sports. Not only is it fun to go swimming on a warm summer day, but also knowing how to swim may help you to save someone's life when an accident happens in or on the water.

Dick was taking swimming lessons from a man who had won many swimming races. This man was teaching Dick

the crawl stroke. This is the most popular of all swimming strokes. It is used by champion swimmers because it is the fastest stroke. It gives exercise to all the big muscles in the body without making them work too hard.

"The first thing to learn before practicing the crawl stroke is how to breathe," said the swimming teacher. "Unless you learn how to breathe properly in the water you will never be a good swimmer, no matter what sort of stroke you use."

"

A swimming lesson.
What is the first thing these boys must learn?

Roberts

The teacher had Dick stand waist-deep in the water. "Now place your hands on your knees and put your face close to the surface of the water. Turn your head to one side. Now breathe in through your mouth."

Dick opened his mouth and took a deep breath.

"Now put your face in the water and breathe out through your nose under water."

Dick had to practice breathing in this way for some time before the teacher allowed him to start learning to swim a stroke.

When swimming or diving, it is important never to breathe in either through the mouth or through the nose while your face is in the water. The water may be forced into the tube running to the ear and cause serious ear trouble.

GUARDING THE EARS FROM OUTSIDE INJURY

You can learn more about the eye simply by looking at it than you can learn about the ear by looking at it. The part of the ear you see has very little to do with the sense of hearing. People who have lost the outside part of their ears can still hear very well. It is thought that the outside ear collects sound waves and directs them into the ear.

The hearing part of the ear is so very tiny and so easily hurt that it is placed deep in the bones of the head. The middle ear is so small that five or six drops of water would fill it. The inner ear, where the hearing nerves are located, would go inside a thimble. This part of the ear is enclosed in the most solid bone in the body. The middle ear also is

Rittase

Why do football players wear helmets?

enclosed in bone. The little hallway leading from the outside world to the eardrum is curved like the letter S so that nothing entering the ear will directly strike the eardrum.

Yellow wax comes from the walls of this hallway. You may have seen it on your washcloth after washing your ears. The odor of the wax is disagreeable to insects. When an insect does fly in, it is caught in the sticky wax. The wax sometimes forms a hard ball that plugs the outer ear tube. This may cause loss of hearing until it is removed.

Never try to remove from your ear hardened wax or an insect or anything else which is beyond reach of your middle finger. If you poke in your ear with a toothpick or hairpin or some other sharp tool, you may scratch the walls of the tube or even injure the tender eardrum. Ask your parents to take you to a doctor if you think something is stopping up your ear.

You know that you can break a pane of glass if you hit it hard with a ball or some other object. If you have ever gone bathing in the ocean, you know that a big wave may come toward the shore so fast that it will knock you down. Some sounds, such as the firing of a cannon or the explosion of a giant firecracker, may make such big strong waves in the air that they will hurt the eardrum when they strike against it. Soldiers have lost their hearing in the loud noises of war. Perhaps you have read newspaper stories about aviators who lost their hearing for a time because of the noise made by the airplane engine when they flew a great distance.

Shrill or sharp or very loud noises of all kinds are very hard on the ears. Some people think it is fun to burst a paper bag full of air or to blow a horn close to someone's ear or to set off giant firecrackers in order to make a person jump. But people usually do not want to hurt other people just for fun. Making a loud noise close to a person's ears or striking a person on the ear may hurt the eardrum.

In the rough and tumble of a football game, the players wear helmets because they expect hard knocks. They know that hard blows may hurt their ears. In everyday life people do not wear helmets. They must trust each other not to do things that will take away their sense of hearing.

ARE YOU DOING YOUR BEST TO TAKE GOOD CARE OF YOUR EARS?

Do you blow your nose gently?

Do you put nothing into your ears except a clean washcloth and towel?

Do you have your hearing tested every year?

Do you help the doctor as much as you can by doing what he tells you to do when you have any kind of ear trouble?

Do you help other people to protect their ears by remembering not to make very loud noises close to their ears and not to hit anyone directly on the ears?

1. Which of the following actions are wise? Which are foolish?

Give the reason for each choice. (*Do not write in the book.*)

a. Blowing the nose hard when you have a cold.

b. Going to the doctor immediately when you have an earache.

c. Breathing in while you are swimming under water.

d. Trying to get something out of the ear with a toothpick wound with cotton.

e. Having the ears examined after an illness that may cause loss of hearing.

f. Setting off a big firecracker to scare someone.

g. Having a hearing test once a year.

h. Washing the ears only with your own washcloth.

i. Slapping children on the ears when they do not behave.

j. Speaking in a low pleasant voice.

2. Supply the missing word or words in each sentence below the box, using the word or words from the box which complete the sentence. (*Do not write in the book.*)

mucus	noises	brain
audiometer	infection	Eustachian tube
blow	breathe	eardrum
doctor	waves	

Sound is carried along through the air in __?__.

The __?__ quivers, or vibrates, when a sound wave strikes it.

The __?__ recognizes sounds for us.

The __?__ __?__ is the only opening from the outside world to the inside part of the ear.

Blowing the nose hard may force __?__ into the middle ear.

Earache may be caused by an __?__ in the middle ear.

A person who has an earache should go at once to a __?___.

In many schools the children's hearing is tested every year with an __?___.

It is important to learn how to __?__ properly in learning to swim.

Loud __?__ or a hard __?__ on the ear may injure the eardrum.

THINK ABOUT THESE QUESTIONS

1. Have you ever stood on a hillside and heard your voice come bouncing back to you when you called? The people who lived long ago in Greece explained echoes in this way: They said that a beautiful maiden, named Echo, made the queen of the gods angry because she talked too much. She always wanted the last word. Finally the queen said to her: "You shall lose the use of your voice except for the one purpose you are so fond of, namely, to reply. You shall still have the last word, but never the first word." From that time forward Echo lived in caves and among mountain cliffs. Little by little her body shrank away. Nothing was left of her but her voice, which always had the last word, but never the first.

From what you have learned about sound waves, how do you explain an echo?

2. A method of communication is a way people have of making things known to other people. What are some of the ways in which people use sound as a method of communication?

3. What are some of the enjoyments you would miss if you lost your hearing? What are some of the things you can do to guard your hearing? How can you protect the hearing of other people?

1. On a day when the wind is not blowing, throw a pebble into a pool of water and then throw in a cork. Does the cork bob up and down in the waves without moving far from the place where it hit the water? Waves do not move far in still water, just as sound waves do not move far in the air. Wind blowing over water drives water waves ahead of it. Have you noticed that your voice does not travel far in some directions on a windy day? The wind drives the sound waves in the direction in which it is blowing.

2. The next time you are swimming, have someone knock two stones together under water while you listen from some distance with your ear held close to the water. Is water a good carrier of sound waves? Find out whether sound waves travel farther through water than through air.

3. Find out how fast sound travels and how fast light travels. The sun is about 93 million miles from the earth. How long does it take the light of the sun to reach the earth? If sound waves from the sun could reach the earth, how long would it take them to cover the distance?

4. Find out ways in which people who are hard of hearing can understand what other people are saying. What are the schools in many places doing to help boys and girls who are hard of hearing?

5. Find out the arrangements for hearing that different animals, such as beasts, birds, and insects, have. Do some animals hear better than we do? In what ways does a good sense of hearing help to protect beasts and birds from harm? In what ways does your sense of hearing help to keep you from having accidents?

WORD STUDY

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

town crier	quiver	inner ear
erect	vibrate	Eustachian tube
mucus	eardrum	communication
audiometer	middle ear	

2. Make sentences, using blanks which can be filled by using words in the list above. Exchange your sentences with those of another pupil, and try to complete the sentences he or she has made.

UNIT VI

Guarding the Nose

Supplies are carried into your body over two routes. The traffic on these routes is very heavy. Over the mouth route food and water enter your body. The nose is the route over which air enters. It is also the route for smells. You are the policeman who keeps traffic moving over the two routes. Guarding the nose means keeping the nose route open so that you can breathe through it. It also means doing the best you can to keep germs from entering your body through the nose.

You have a nose to breathe through and to give you the sense of smell. Many people do not make the most of their noses. Are you making the most of yours?

DO YOU KNOW

What special arrangements the nose has for making air ready to enter the lungs?

In what ways the nose route to the windpipe may be blocked?

Why some diseases in the beginning are like "wolves in sheep's clothing"?

What causes colds?

When a cold is not a cold?

How to take care of a cold?

How to keep a cold to yourself?

Why playing out of doors in the sunshine helps to make the body an unhealthful place for cold germs?

Why people who drink alcoholic beverages a great deal are more likely to have pneumonia than other people?

The eyes have only one job—helping us to see. The ears have only one job—helping us to hear. But the nose has two jobs. It is the special organ for the sense of smell; it is also the special pathway over which air travels in going to and from the windpipe. The windpipe is the tube down which air travels from the back of the nose and throat to the lungs. Of course, it is possible to breathe through the mouth. Open your mouth now and breathe in and out through it several times. Do you notice how quickly your mouth and throat begin to feel dry and cold? Air usually is cooler and drier than the inside of your body. Air also contains dust. You can see the dust when it reflects light from a sunbeam.

By taking a wide straight road from one place to another you can get there more quickly than if you take a narrow path winding over the hills and down through the valleys. When you breathe through the nose the air is obliged to take a narrow winding path on the way to the windpipe. There is more time for things to happen to the air on this path than on the wide straight road leading from the lips to the back of the throat. Besides, the nose has special arrangements for making the air ready to enter the lungs.

Hairs in the nose catch and hold dust. The skin which lines the inside of the nose is well supplied with tiny blood vessels. The blood flowing through the blood vessels is warmer than the air. Heat passes from the blood and warms the air as it travels through the nose. The skin which lines the nose is also kept moist. Air passing through the nose takes up some of this moisture. When air reaches the

windpipe from the nose it has been cleaned, warmed, and moistened. This clean warm moist air is much less likely to harm the lungs than is the dry dusty cold air breathed down into the lungs from the mouth.

Road Blocked Ahead

The Jones family were on an automobile trip. They were riding merrily along the highway when they saw a sign which said *Road blocked ahead.* Mr. Jones slowed down. A little farther along stood a sign with a hand painted on it. The hand pointed to a road running off to the left. Under the hand was printed the word *Detour.*

"Bother," said Mr. Jones.

The automobile bounced and jounced over the rough road of the detour. Mr. and Mrs. Jones and the young Joneses gave a whoop of delight when they came to the end of the detour and saw the smooth highway ahead.

The nose route is the main highway over which air travels to the windpipe. The mouth route is a detour. Air must get to your lungs or you will die. This is why a detour has been provided in case the main highway is blocked. But mouth breathing is very uncomfortable, as most detours are.

How the Nose Route May Be Blocked

You have learned that there is a tonsil, usually called the adenoid, on the upper back wall of the throat close to the place where the nose opens into the throat. The adenoid may become diseased or too large when it is obliged to fight cold germs too often or for too long a time. An

enlarged adenoid may block the nose route. Then it is necessary for air to take a detour through the mouth.

It sometimes happens that the nose itself is blocked by a crooked bone, a bony growth, or some other obstacle. An obstacle is anything that blocks or stands in the way. Perhaps you have run an obstacle race in which you had to jump over or go around things placed in the path of the racers. Air must run an obstacle race to travel through the nose if something is blocking its path.

Boys and girls who find it hard to breathe through the nose should have a nose-and-throat examination. The doctor will decide what should be done if he finds that the adenoid has become too large or if some other obstacle is blocking the nose. Many boys and girls have found how much more comfortable it is to breathe, and how much healthier they are, when air can take the nose route to the windpipe instead of having to make a detour through the mouth.

WHAT HAPPENS TO AIR IN THE LUNGS

The windpipe lies just in front of the pipe down which food passes from the throat to the stomach. The top of the windpipe is fitted with a little lid which closes when food is swallowed. If it were not for this lid some of the food might get into the windpipe. Have you ever choked on a bit of food? Sometimes when you take a breath and swallow at the same time, the little lid does not close quickly enough to keep food out of the windpipe. Then the muscles in the windpipe must force out the food. This is what makes you choke and cough when food "goes down the wrong way."

When the windpipe reaches the lungs, it branches out like the branches of a tree. The branches become smaller and smaller until finally they end in tiny elastic bags called air sacs.

The air you breathe out is different from the air you breathe in. Have you ever blown on your hands in the wintertime to warm them? If so, you know that the air which leaves your lungs is warmer than the surrounding air. Have you ever *seen* your breath on a cold day? The moisture in the air you breathe out is turned to fine drops of water, which you can see when cold air strikes it. Heat and moisture are both given off with every breath from your lungs.

You cannot see the results of two other things that happen in the lungs. In the walls of the air sacs there are tiny blood vessels. Part of the oxygen from the air you breathe in passes from the air sacs into the blood flowing through these blood vessels. At the same time the waste gas, carbon dioxide, which the blood has collected from the body cells, passes from the blood into the air sacs. This waste gas is carried out of the body when you breathe out.

ALL ABOUT COLDS

The boys and girls in Miss Allen's class liked to make up riddles. They made up geography riddles and history riddles and nature-study riddles. They liked best to guess the name of something from its description. They called a riddle of this kind *What Am I?* The members of the class took turns in making up *What Am I?* riddles for the rest of the class to guess.

One morning in November Anne said to Miss Allen, "It is your turn to make up a *What Am I?* riddle."

"I know it is," said Miss Allen. "I made one up last night and wrote it on a slip of paper. It really isn't a very difficult riddle. You shouldn't have any trouble in guessing it."

Miss Allen read the riddle to the class. This is what she read:

What Am I?

"I make a lot of trouble for people every year. I do my best work from early fall until late spring. I make noses red and swollen. Then the owners of the noses must breathe through their mouths. Sometimes I make people's eyes water and their noses run and their throats feel sore. I make them cough and sneeze.

"The people who are afraid of me work hard to keep from getting me and to keep me from spreading from one person to another. But most people think that I don't amount to much, and they don't pay any attention to me. They know that I am disagreeable, of course, but they do not know that I may be dangerous. They do not realize that I may lead them into worse trouble than I can cause directly by myself. What am I?"

"I know what it is," said Walter, Frank, Mildred, and Anne, all speaking together.

"Do you know, Herbert?" asked Miss Allen.

Herbert had just stopped sneezing into his handkerchief. "I know I've got a cold," he said.

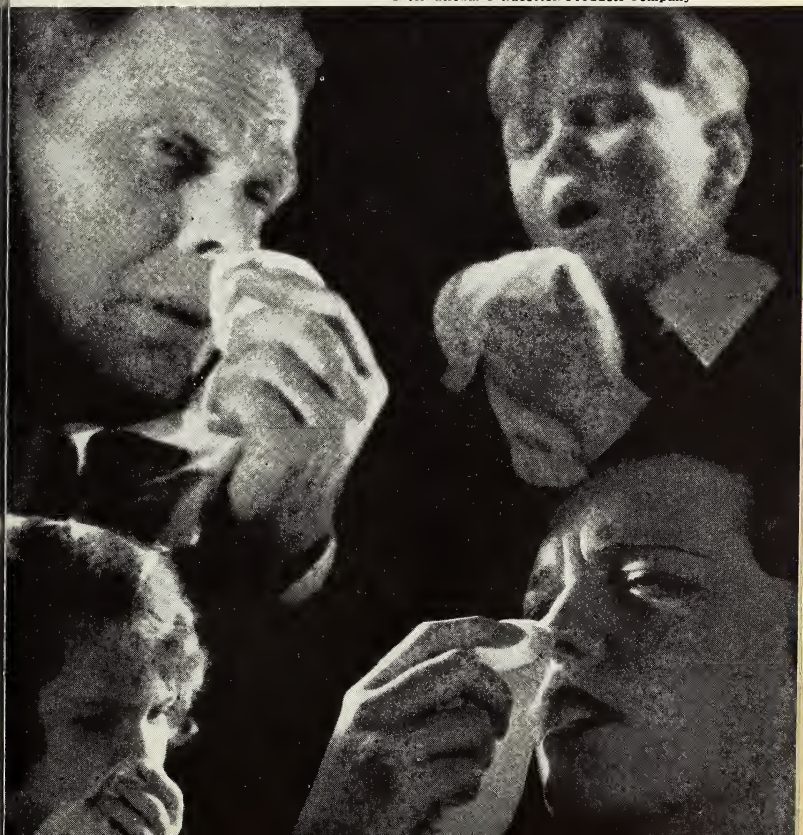
"Yes, you brought the answer to the riddle to school with you this morning," said Miss Allen. "And I'm going

to ask you to take your cold back home again before it becomes worse. Besides, it's safer for the rest of us. We might catch it, and you wouldn't want that to happen, would you?"

"I should say not," said Herbert. "You left something out of that riddle, Miss Allen. You should have said, 'The person who has me may give me away and yet keep me.'"

"

I make people cough and sneeze. What am I?



International Cellucottor Products Company

What Is a Cold?

A cold is caused by germs, and a strong healthy body can fight colds better than a weak body can. But no one knows what the cold germ looks like, for no one has ever seen it.

We have learned to know colds mostly by what they do. A cold all by itself makes us thoroughly uncomfortable. But the worst thing about a cold is that it may so weaken the body that it cannot fight the germs of diseases which are more serious than colds. A bad cold or a cold that lasts a long time may be followed by pneumonia or tuberculosis or some other serious illness.

Wolves in Sheep's Clothing

There is an old story which says that a wolf, once upon a time, decided to wear a disguise because he thought he could earn his living easier by doing so. To wear a disguise means to wear something which will change a person's appearance so much that he will not be recognized. The wolf put on a sheep's skin and got in among a flock of sheep. He looked so much like the sheep that even the shepherd was fooled.

When night came, the wolf was shut up with the sheep, and the door was fastened. Later on the shepherd, wanting some mutton for supper, went in to fetch out a sheep. Instead of a sheep he got the wolf, and killed him on the spot. For hundreds of years the fable of "the wolf in sheep's clothing" has been told to warn people not to judge by looks alone.

Many communicable diseases in the beginning are like "wolves in sheep's clothing." The disguise they wear is the disguise of a cold. A boy or girl coming down with measles or scarlet fever or whooping cough may appear at first to have "just a cold." Bed is the place for a person who is sick. He will get well faster if he goes to bed at once. But if he thinks he has "just a cold," he may not go to bed. Delay in going to bed may mean delay in getting well. Besides he will be a danger to everyone he meets who has not had the sickness.

As soon as a doctor knows that a boy or girl has a communicable disease, he tells the board of health or the health officer in the community, and a sign is placed on the door of the home telling other people to keep out. The home is then said to be in quarantine. But there is no way of knowing that a person who seems to have "just a cold" may really be getting measles or whooping cough or scarlet fever. This is one reason why it is so important to keep away from people who cough or sneeze carelessly.

How to Take Care of a Cold

Patrick was a smart boy, no one could deny that; but he was likely to believe everything people told him. It once happened that Patrick had a bad cold, and his teacher sent him home from school. On the way he met Mrs. Smith.

"Good morning, Mrs. Smith," said Patrick. "Kerchoo, kerchoo! I am going home because I have a very bad cold."

"So I see," said Mrs. Smith. "You tell your mother to go to the drugstore and buy some cure-a-cold pills. Take one every hour and you'll feel better before night."

"Thank you for your advice," said Patrick. And on he went.

The next person he met was Mr. Brown.

"How do you do, Patrick," said Mr. Brown. "Why aren't you in school this fine morning?"

"Kerchoo! Mr. Brown," said Patrick. "My teacher told me to go home because I have a very bad cold."

"So I see," said Mr. Brown. "Now, I'll tell you what to do. Ask your mother to go to the drugstore and buy kill-a-cold gargle. Gargle with it every hour and you'll be able to go back to school in the morning."

"Thank you for your advice," said Patrick. And on he went.

After he had crossed the street, whom should he meet but Mike, the boy who delivered groceries.

"Why, hello, Pat," said Mike. "I've just been at your house. Is your school having a holiday?"

"No," said Patrick. "The teacher sent me home. I have a very bad cold. Kerchoo!"

"That's too bad," said Mike. "I'll tell you what to do. Ask your mother for a quarter and go to the drugstore. Buy a bottle of no-cough mixture. Take a spoonful every hour and you'll feel great tomorrow."

"Thanks a lot, Mike," said Pat. And on he went.

As Patrick walked up the steps of his home, his mother, Mrs. Green, opened the door.

"Why, Patrick," she said. "Why have you come home from school at this hour?"

"Oh, Mother," said Patrick, between a cough and a sneeze, "my cold is much worse, and the teacher sent me home. On the way I met Mrs. Smith, and she said to take

cure-a-cold pills, and Mr. Brown says to gargle with kill-a-cold gargle, and Mike says to take no-cough mixture. So you'd better go to the drugstore and buy them all."

"Nonsense!" said his mother. "You go right upstairs and take off your clothes and get into bed. I don't suppose you have thought of asking a doctor for *his* advice?"

"No," said Patrick, "I never thought of that."

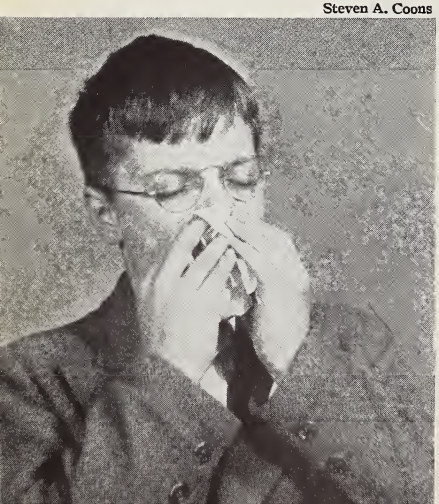
"Remember," said his mother, "that when a person is sick, he needs to ask the doctor what to do. He should not take advice from everybody and get into worse trouble."

How is this girl helping her body to fight a bad cold?

So Mrs. Green called the doctor, and the doctor told Patrick to stay in bed and to rest and keep warm for two or three days. "Drink plenty of milk and water and fruit juices, too," said the doctor. "Resting in bed and drinking liquids are the two best things you can do when you have a bad cold."

There is no one medicine that can cure everybody's cold. Some of the pills and cough mixtures that are sold as "cold cures" contain drugs that are bad for the heart and blood. Some of them contain drugs that are habit-forming. Perhaps you have heard or read in the newspapers about someone who is a "slave of the drug habit." This means that the person has so strong a habit that he cannot get along without the drug. A person usually becomes the slave of a drug after he has been taking the drug for some time. Doctors very rarely give their patients medicines that contain habit-forming drugs. They do this only when it is necessary, and then only for a short time.

Steven A. Coons



A person who takes a medicine that he does not know anything about, except that it was praised by some friend or advertised widely, is taking a foolish risk. Even if the medicine is harmless, it may keep the person from going to a doctor at the very start of his illness. It is much easier for

a doctor to help people if they call him as soon as they begin to feel ill rather than later when they are very ill.

When a person has a cold, his body must do the work of fighting it. Anything that helps the body in its fight helps to cure the cold. Boys and girls who have bad colds with fever should stay in bed. It is best to have a doctor.

Any cold will be cured more quickly if the person who has the cold stays in bed or at least indoors for a day or so. He should eat simple wholesome food and drink plenty of liquids. Very few colds will be followed by serious illnesses if a person who has a cold is wise enough to take good care of himself.

How to Keep a Cold to Yourself

A person who has a cold sprays germs into the air when he coughs or sneezes without covering his mouth and nose with a handkerchief. If he uses his hand to catch the cough or sneeze or puts his fingers to his lips, he may leave cold germs on whatever he touches afterward. He also may leave cold germs on the rims of cups and glasses and on forks and spoons and on the towel he uses.

When you have a cold, you may show that you are a good citizen by doing everything you possibly can to keep your cold to yourself. A clean handkerchief, carried where you can reach it easily when you feel a cough or sneeze coming, helps to protect other people from your cold. The best handkerchiefs are pieces of soft paper or clean old cloth which may be burned after use. Use only your own handkerchiefs, and do not leave them lying about for someone else to pick up.

Wash your hands often with soap and warm water, and dry them on your own towel or on a paper towel that may be thrown away. Make sure that all the utensils you use in eating and drinking are washed afterward with hot soapy water and rinsed with boiling water.

Arming the Body for the Fight against Cold Germs

A boy stood on a little hill. In his hand he held a dandelion that had gone to seed. He drew in a deep breath and then blew it out at the dandelion. Away flew the seeds, each one held up by its tiny parachute of fuzzy down.

The boy could not see where the dandelion seeds went. They were scattered all over the hillside. Some fell on stony places where they could not take root, and so they died. Some fell among weeds. The strong weeds choked the little dandelion plants when they started to grow. But other seeds fell in bare places where they could take root and grow into healthy dandelion plants.

When a person coughs or sneezes without covering his nose and mouth with a handkerchief, many more germs are blown into the air than there are seeds in a dandelion. We cannot see where the germs go. But this is what usually happens to them: Many of them are scattered where they cannot get food and moisture. Like the dandelion seeds that fell on stony places, they quickly dry up and die. Others are breathed in by people who have strong healthy bodies. The germs may start to grow, but they are quickly overcome by the healthy bodies, just as the dandelion seeds that fell among weeds were choked to death. But some of the germs

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There are more germs in a cough
than seeds in a dandelion

KODACHROME BY STEVEN A. COONS

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are breathed in by people whose bodies are not strong enough to fight and overcome them. Then the germs take root and grow quickly, and these people come down with colds.

How may we have the kind of body that is able to overcome cold germs? First, we must eat the right kinds of food every day. You have learned that milk, vegetables, fruits, eggs, and cod-liver oil are called protective foods. They were given this name because they help to protect the body against certain illnesses. People who eat these foods every day are less likely to catch cold than people who do not eat enough protective foods.

Get plenty of rest. Sleep eleven hours every night in a room with at least one window opened top and bottom. A window opened in this way keeps the air of a room always in motion.

Work, play, and study, as well as sleep, in rooms that are well aired. A well-aired room is one in which the air is kept moist, moving, and neither too hot nor too cold. For people who are not using their muscles in hard work or play, a temperature of 68 degrees is about right for health and comfort. This temperature would be too warm if you kept on the extra wraps which you wear when you go outdoors in cold weather. This is why you are more comfortable and less likely to catch cold if you remove outdoor wraps as soon as you come indoors.

Play outdoors in the sunshine every pleasant day. The best air of all is outdoor air. Exercise hardens your muscles and makes your skin healthy and rosy. Sunlight shining directly on your skin can do more for your health than sunlight shining through glass.

Keep from getting chilled. People catch cold after they have been chilled, because chilling weakens the body. Then the body cannot fight germs as well as usual. Wear enough clothes to be warm and comfortable when you go outdoors in cold weather. Keep your feet warm and dry in rainy or snowy weather. Wear rubbers or overshoes to school. Remove them indoors. Woolen socks or stockings will keep your feet warm when you play in the snow. If you get your feet wet, rub them hard with a rough towel when you get home and then put on dry shoes and stockings. Cool off slowly when you are hot and sweaty after exercise. Do not sit down and let a strong breeze cool you off suddenly even in the summertime. Have you noticed that the members of a baseball team usually put sweaters over their shoulders when their side is at bat? They cannot afford to catch cold. The best thing to do after hard outdoor exercise is to put on a sweater and go home or to the school gymnasium for a shower and a rub.

You may do everything you can to have a strong healthy body, but something that you cannot possibly find out for yourself may be making it impossible for your body to overcome cold germs. This is one reason why it is important to have a doctor give you a health examination every year, and to go to the dentist every six months.

How Alcohol Helps the Cold Germs

Some grown-up people think that whisky or some other drink that contains alcohol will keep them from catching cold. A drink containing alcohol is called an alcoholic beverage. People think that an alcoholic beverage keeps them

warm because alcohol makes the little blood vessels in the skin become larger. Then more blood flows through the skin. This gives the skin a feeling of warmth. But you have learned that the body keeps heat from escaping on a cold day by making the blood vessels in the skin shrink, or get smaller. A person who has had two or three drinks containing alcohol really loses more heat instead of less heat from his body. People who are in the habit of drinking large amounts of an alcoholic beverage are much more likely to have pneumonia than are people who do not drink it.

ARE YOU DOING YOUR BEST TO MAKE GOOD USE OF YOUR NOSE AND TO KEEP FROM HAVING COLDS?

Do you breathe only through your nose?

Do you always cover your mouth and nose with a clean handkerchief when you cough and sneeze?

Do you stay away from people who cough and sneeze carelessly?

Do you stay home from school when you have a bad cold?

Do you rest as much as possible when you have a cold, and drink plenty of liquids?

Have you formed the habit of taking only medicines that a doctor tells you to take?

Do you wash your hands often with soap and warm water when you have a cold?

Do you always wash your hands before eating and use only your own washcloth and towel?

Do you eat and drink only from clean utensils?

Do you drink milk with every meal and eat vegetables and fruits every day?

Do you sleep eleven hours every night?

Do you play outdoors in the sunshine every pleasant day and wear clothes that keep you warm and dry when you go outdoors in cold or stormy weather?

Do you cool off slowly after exercise that makes you hot and sweaty?

1. Choose the correct ending for each of the following sentences. (*Do not write in the book.*)

a. Air breathed in is cleaned, warmed, and moistened in (1) the mouth (2) the nose (3) the windpipe.

b. If a person has trouble in breathing through the nose, the best thing to do is to (1) breathe through the mouth (2) try very hard to breathe through the nose (3) go to the doctor for a nose-and-throat examination.

c. The best thing to do when one has a cold is (1) to take a cold medicine praised by a friend (2) to rest as much as possible and drink plenty of liquids (3) to pay no attention to it.

d. A person who has a cold shows that he is a good citizen by (1) going to school in order not to spoil the class attendance record (2) coughing into his right hand in order not to spread the cold germs (3) staying away from people as much as possible, coughing and sneezing only into a handkerchief, and washing his hands with soap and water often.

e. The best room temperature for people who are sitting indoors and wearing their ordinary clothes is (1) 60 degrees (2) 68 degrees (3) 75 degrees.

2. Which of the following statements are true and which are false? Reword each false statement so as to make it true. (*Do not write in the book.*)

a. Colds are caused by germs.

b. What seems to be a cold may really be the beginning of a more serious illness.

c. A person who takes a medicine that has not been ordered especially for him by a doctor is taking a foolish risk.

d. People who seldom drink milk and who eat few fruits and vegetables are less likely to catch cold than are people who eat more of these foods.

e. A ten-year-old boy or girl should sleep nine hours every night and keep the windows closed in cold weather.

f. The best air of all is outdoor air.

g. Sunlight shining through glass is more healthful than sunlight shining directly on the skin.

h. The best way to cool off in the summertime is to sit in a breeze and drink lemonade.

i. Alcoholic beverages keep people from catching cold because they make the skin feel warm.

THINK ABOUT THESE QUESTIONS

1. The flavor of food is as much a matter of smell as it is of taste. Can you explain why it is that food loses much of its pleasant flavor when you have a bad cold?

2. Think back to the time you last had a bad cold. Did you miss any good times because of it? Did you lose any days from school? Do you know why you caught cold? What did you do for your cold? How long did it last? Would you act at all differently if you should have another cold? What are some of the things you would now do if you had a cold?

3. Look in the mirror as you breathe through your mouth. Do you like the way you look? How do your mouth and throat feel? What may cause mouth breathing? What would you do first if you found that you had trouble in breathing through your nose?

DO THESE THINGS

1. Ask a committee of the class to find out how many absences have been caused by colds since the beginning of the year. If some of the pupils cannot remember, the teacher may help by looking through the class-attendance records. Plan ways of reducing the number of colds. Keep a record of colds from now to the end of the year, and see

if you can make a better record than the one for the first part of the year.

2. A central heating and ventilating system is a system for supplying the rooms of a building with heated moist moving air. What arrangements are made in your school for heating and ventilating? A committee of the class may get the answer to this question from the janitor.

Do you have a thermometer in your classroom? If so, is it placed where the pupils can read it? Do you read the thermometer at certain times during the day and keep a classroom record of the temperature? What is done when the temperature goes much above or below 68 degrees?

Is fresh clean moist air blown into your classroom from a central heating and ventilating system? Talk over in class ways in which you may help to keep your schoolroom well aired if you do not have a central heating and ventilating system.

WORD STUDY

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

detour	habit-forming	utensil
obstacle	pneumonia	alcoholic beverage
blood vessel	tuberculosis	central heating and ventilating system
air sac	disguise	
board of health	quarantine	

2. From the list above select the word or words described by each one of the following groups of words:

a drink containing alcohol
two diseases that may follow a cold that lasts a long time
anything that stands in the way
method used to keep communicable disease from spreading

UNIT VII

Making the Most of Bones and Muscles

When you wish to know how you look, you stand in front of a mirror. Really, you are in front of a mirror all day long. A picture of you is carried from the eyes to the brain of every person you meet. If the person does not know you very well, your appearance is the only way he has of telling what sort of person you are. You may be a fine fellow or a pretty girl, but if you have not trained your muscles to support your bones properly, a stranger looking at you will think only, "My, what round shoulders that poor boy has!" or "Isn't it too bad that such a pretty girl has a weak neck!"

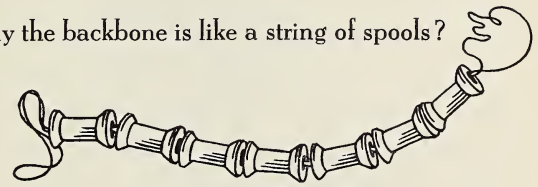
The way you look and what you do are made possible by the teamwork of your brain, muscles, and bones. If you wish to tell other people either in spoken words or in writing what is in your mind, your brain, your muscles, and your bones must work together to help you to speak or write. As you walk down the street or play a game, your posture tells other people whether you have trained your brain, your muscles, and your bones to help you to make the most of yourself.

DO YOU KNOW

How your bones are put together?

Around which part of the skeleton the other bones are built up?

In what way the backbone is like a string of spools?



Whether you have any bones that cannot move?

How the muscles move the bones?

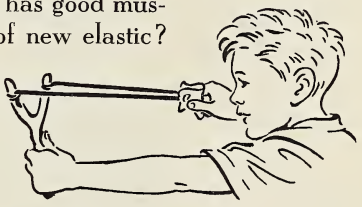
What is meant by "good form" in playing games?

What you can do to have good posture?

What is meant by flat feet?

Why the muscles need exercise?

In what way a body which has good muscle tone is like a piece of new elastic?



Why outdoor play gives you a good appetite?

Why the muscles need rest?

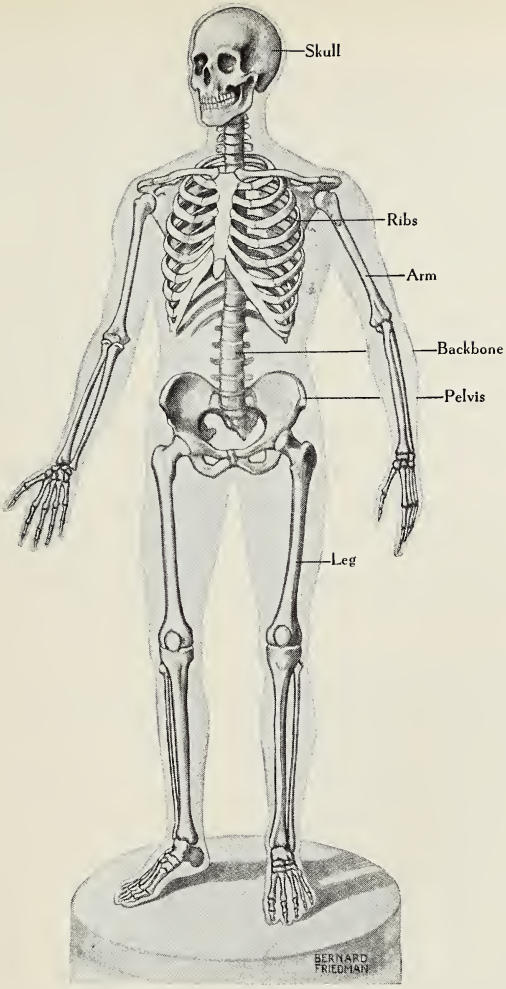
If you look at your body in the mirror, you see that it has four main parts—the head, the trunk, the arms, and the legs. The head is formed of a round box of bones called the skull. The skull protects the brain. It is perched at the top of a column of bones called the spine, or backbone.

The spine is made of thirty-two small flat bones laid one above the other. It extends all the way from the top to the bottom of the trunk. You can feel the bones of the spine by running a finger down the middle of your back. Each one of the bones in the spine has a hole through the center like the hole in a spool. A thick rope of nerves runs through the hollow backbone as a string runs through a string of spools. This rope of nerves is called the spinal cord.

Nerves running from the outside of the body to the brain or spinal cord carry the messages that tell you about the outside world. Very often these messages make you want to move. Nerves running to the muscles from the brain or spinal cord carry the messages that make the muscles move.

The whole skeleton of the body is built up around the spine. Curving out from the upper part of the spine are the ribs, which join the breastbone in front to form the bony cage that holds the lungs and heart. The cage is called the chest. At the top of the chest there is a ring of bones to which the bones of the upper arms are fastened.

At the lower end of the trunk the spine joins a saucer-shaped arrangement of heavy bones called the pelvis. The pelvis helps to hold up the stomach, the large and small intestines, and other organs in the lower part of the trunk. From the pelvis the bones of the hips extend downward.



By studying this drawing of the skeleton,
you will see how the different parts are built up
around the backbone, or spine

The Place Where Two Bones Meet

The places in the skeleton where two bones meet are called joints. Most bones are movable at the places where they join other bones, but some are not. The skull which guards the brain, for example, is made of bones which are locked tightly together at the joints.

Some bones can move a little at the joints. For example, the bones which form the backbone have springy cushions, or pads, between them. These cushions allow the bones of the spine to move a little at the joints. The reason you can bend forward, sideways, and backwards is because a springy pad lies between each bone in the spine.

The bones which meet to form the joints of the shoulders, the elbows, the wrists, the fingers, the hips, the knees, the ankles, and the toes all move easily against each other. The ends of two bones which meet to form a movable joint are held in place by tough bands called ligaments.

HOW BONES AND MUSCLES WORK TOGETHER

A pair of scissors lying on a table cannot move. Suppose you wish to cut paper with the scissors. To do this you pick up the scissors, and by the motions of your hand you bring the blades together and then pull them apart. The two movements in opposite directions follow each other very rapidly. When you use a pair of scissors, the blades are connected not only by the screw at the joint but also by your hand which supplies the moving power. Just so, movable bones are joined together not only by the ligaments

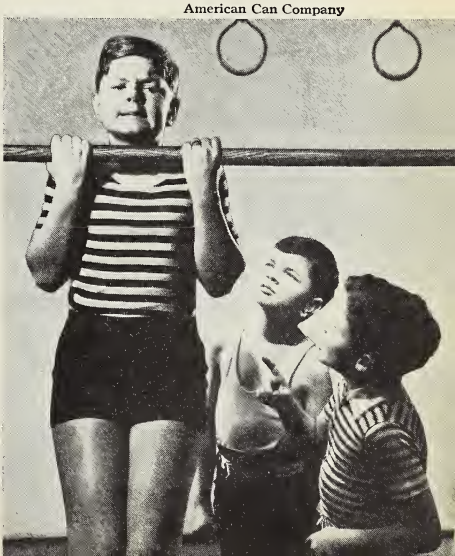
which hold the two ends of the bone together but also by the muscles which move the bones.

You can easily see that if a muscle is fastened at one end to one bone and at the other end to another bone, the two bones will bend at the joint and be drawn toward each other when the muscle connecting them grows shorter. If there is another muscle fastened to these bones which pulls them in the opposite direction, the bones will be straightened out again when this muscle grows shorter. Really, this is the way in which bones are moved. Muscles are fastened to the bones in pairs. One muscle of the pair shortens and pulls the bones in one direction. This muscle then relaxes, or takes a rest. The other muscle of the pair then shortens and pulls it in the opposite direction.

The muscles are fastened to the bones by tough cords called tendons. The next time you eat the drumstick or wing of a chicken, look for the white cordlike tendons which fasten the muscles in the chicken's leg or wing to the bones.

The bones in the skeleton are held in their places by a system of ligaments and muscles just as the mast of a ship is held in its place by ropes and props. It is easy to prove this to yourself. If you let yourself go limp as you sit in a chair you lose your shape.

American Can Company



Bones and muscles working together

A Relay Race

There was great excitement on the playground of Highland School. The pupils of that school were having an athletic contest with the pupils of Newtown School. There had been jumping contests and a ball-throwing contest and a twenty-five-yard dash. The score of Newtown School was a little higher than the score of Highland School. The last contest was to be a relay race. The school that won this race would win the whole contest.

Martin was leader of the relay team for Highland School. He liked to play on a team better than to do things by himself. It was more fun to plan ways of having the team win than to win alone.

The racing track on the playground was divided by chalk lines into four equal lengths. Each one of the four equal divisions was called a lap of the race. The four members of each relay team were to run one lap apiece. The two boys who were to start the race stood with their toes touching the starting line ready to go. Each one held a stick in his hand.

"They're off!" shouted the people who were watching the race. The two runners were very close together when they reached the chalk line at the end of the first lap. The sticks were grabbed from their hands by two other boys standing with their toes on the line. These boys went on with the race. When the chalk line at the end of the second lap was reached, the boy running for Highland School was a little ahead.

"Hurrah!" shouted the boys and girls of Highland School.

Gendreau

Are these boys showing good form?
Ask your physical-education teacher

"

But Fred, the third runner who took the stick for Highland School, tripped and almost fell. The runner from Newtown School passed him. Fred was two yards behind when he passed the stick to Martin who was waiting to run the last lap of the race. Martin started to run slowly. He held his head up and his shoulders back and his elbows in at his sides.

The Highland School pupils held their breath. Then Martin began to pick up speed.

"My, what good running form that boy has," said a high-

The B. F. Goodrich Company

Good form in playing croquet

school boy who was watching the race. "He'll make a great baseball player." Martin went faster and faster. He passed the runner from Newtown School just before he reached the finish line. He won the race by a foot.

The captain of the Newtown School team shook hands with Martin.

"Your team ran a fine race," he said.

"Your team is good, too," said Martin. "You made us work hard to win. Maybe you'll win next time."

The captain of the Newtown team smiled. "We'll certainly try to," he said.

SHOWING GOOD FORM

The form in which you hold your body is called posture. The person who holds himself in the right way is said to show good form. You may have heard people say of a man playing tennis or golf, or of a boy running a race, or of a dog in a dog show, "He shows good form." For everything you do, from sleeping to playing a game of skill, there is a right way of holding the body.

You feel better, and work more easily, and have more respect for yourself when you are showing good form. Stooped shoulders and a sagging backbone may narrow your chest so that your lungs and heart do not have enough room. The organs of the body cannot work well when they are crowded too closely together.

Do people tell you that you have good posture or poor posture? Has your father or your teacher ever said to you "Straighten up!"? Even if you have been in the habit of letting your body slump, you can train your muscles to hold it straight.

Good posture does not mean that you must stand as soldiers do at attention. Stand and sit and walk in an easy graceful manner. Practice the following standing position until it is comfortable for you to stand in this way. After it becomes comfortable, you will take this position without having to think about it.

Stand tall without rising on your tiptoes. Sway forward so that you feel your weight on the front part and outer edges of your feet. Let your toes point straight ahead. Do not try to stiffen your knees. Forget about them. Lift your chest up and forward. Hold your head high and your chin in.

Practice sitting in the following manner until it is comfortable for you to sit in this way. Rest your feet flat on the floor. Touch the back of the chair with the lower part of your back. Keep your chest up and forward, your head high, and your chin in. When you lean forward, lean from the hips and be careful not to let your chin droop on your chest as a broken lily droops on its stem. After a little practice you will be able to take a correct sitting position without looking or feeling stiff.

Learn good form in playing games. If you have a physical-education teacher in your school, he or she will be glad to help you. Perhaps an older boy or girl who is especially skillful in a game or sport in which you are interested will show you how to gain good form. Study the pictures of athletes in newspapers and magazines for points on good form.

Practicing good sitting posture

Galloway

If you try to take the correct positions when learning a game or sport, you will learn more slowly, but soon you will take these positions naturally. You will find that you can play better and longer without getting tired when you have made good form a habit.

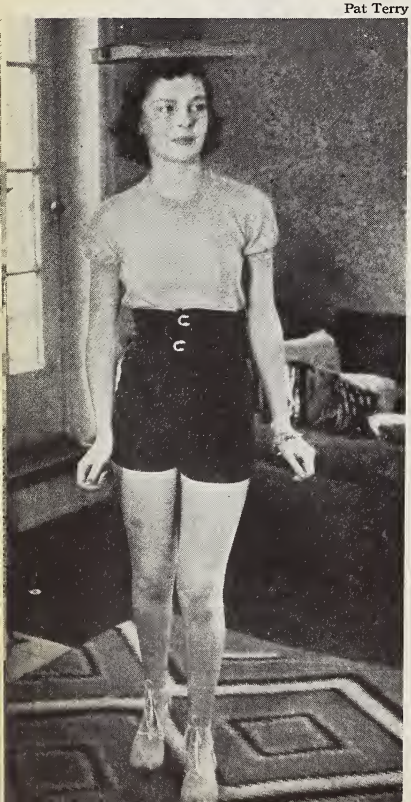
This boy and girl are showing good form in walk

Roberts

MAKING THE MOST OF YOUR FEET

In the city of Pisa in Italy there is a famous tower. It is about as tall as a fifteen-story building, and it is made entirely of a beautiful white stone called marble. The strange thing about this tower is that it tips to one side. It is called "the leaning tower of Pisa." Some people call it the "falling tower" of Pisa, for it tips a little more with each passing century. If you should climb this tower and drop a stone from the lower side of the top story, the stone would strike the ground sixteen and one-half feet from the wall at the bottom.

Pat Terry



The men who started to build the tower more than seven hundred and fifty years ago did not mean to have it tip to one side. But they laid the foundations in sand, and the tower started to tip after the first three stories had been built. To stand up straight a building must have a strong foundation.

The feet are to the rest of the body what the foundation is to a building. If a person's feet are weak, it may be impossible for him to stand up straight and tall. The feet must be strong enough to hold the weight of the body, and they must be able to bend

"

Strong feet help to make a level head

easily in walking, running, or jumping. Strength and springiness depend much on how you use your feet.

The Two Arches That Hold Up the Body

The foot is made up of twenty-six small bones. These bones are held together with muscles and ligaments. The foot is moved by muscles in the leg below the knee. These muscles are fastened to the bones of the feet by long tendons which run down through the ankles.

In this drawing you may see how the long arch of the foot is formed

The ball of the foot is the rounded part of the sole toward the inside edge of the foot just back of the toes. Running from the heel to the ball of the foot several little bones are locked together to make a long arch. This long arch is called the instep. The instep throws all the weight of the body on the heel, the great toe, and the ball and outer edge of the foot.

The arches make walking easier and give spring to the step. They also save the backbone from jars. If the bones in an arch slip out of place, the arch may fall or flatten out. A person with fallen arches is said to have flat feet.

Fallen Arches

Some people are born with flat feet. Usually flat feet do not make trouble for these people. But people whose feet become flat may get tired very quickly when they stand or walk or play running games. Flat feet also may cause pains in the feet or back.

Landing flat on the soles of the feet at the end of a jump may break the arches. Toeing out in walking also may cause flat feet. When you walk with the toes pointed out, the ankles turn in. The whole weight of your body then falls on the inside edges of your feet. This may so weaken the long arches that they flatten out.

The bones in the long arch may slip out of place and let the arch down because of weakness in the muscles of the leg. If the inside part of the ankle is not supported by these muscles, the arch turns over toward the inside. Then the toes point out, the ankle turns in, and the long arch of the foot may become flattened.

How to Avoid Flat Feet

When a foot has good arches, the inside border does not touch the floor. Footprints made by walking with wet bare feet will tell you whether or not you are flat-footed. If you have good arches, your footprint will be narrow in the middle and wide at the heel and at the toes. A flat foot makes a footprint that is almost the same width from heel to toes. You may see whether you are in the habit of toeing out by looking at the heels of your shoes. If the outside edges of the heels are worn down, this is a sign that you toe out.

"Work as well as play help to make strong muscle

Steven A. Coons

To avoid flat feet form the habit of walking always with the toes pointed straight ahead. The weight of your body should fall on the outer edges of the feet instead of on the inside edges. Remember that the inside edges are not built to carry your weight.

Exercise helps to strengthen the leg muscles. Good exercises are skipping, dancing, and walking on tiptoe in bare feet.

The kind of shoes you wear also makes a great difference in the strength and springiness of your feet. In the next unit you will learn about the things to notice when you buy a new pair of shoes.

WHY THE MUSCLES NEED EXERCISE

There is a law of the body which says that any part that is not used must shrink up and wither away. You have muscles to do the work of the body. If you do not give the muscles fastened to your bones a chance to work, then their ability to work is taken away. Exercise makes the muscles work.

Most boys and girls enjoy playing games out of doors and taking part in different sports. They get most of their exercise through play. But work also is good exercise. Perhaps you help your mother make beds and wash dishes and clean house. Perhaps you help your father by mowing the lawn or shoveling snow or raking leaves or taking care of the furnace. Play and work together help to give your muscles the exercise they need.

Can you remember the very first time you ever did anything that required skill? Try to remember, for example,

what happened when you first tried to roller-skate, ice-skate, swim, or play tennis. If you cannot remember, watch a child who is just learning to do something. Skill in doing things is one of the most important things that exercise gives us. It trains the brain, muscles, and bones to work smoothly together.

Exercise strengthens the muscles. The more work the muscles do, the stronger they become. You know this by experience. You can lift and carry heavier things, run faster, climb better, and swim a greater distance, the more you do these things. If the muscles are not exercised, they become weak and flabby. People with flabby muscles may tire quickly when they call on their muscles to do work they are not used to doing.

The tone of the whole body is improved by exercise. To illustrate what is meant by tone, compare a piece of old worn-out elastic with a piece of firm new elastic. The worn-out elastic has no spring to it. A pair of worn-out elastic garters will not hold up your stockings. A piece of elastic that has lost its springiness will not make a good sling. A worn-out elastic band will not hold a bundle of letters or papers together firmly. New elastic does what you want it to do. If you stretch it, it snaps back quickly. A body which has good tone is like a piece of new elastic. It is on tiptoe with life and health. The tone of your body depends on your muscles. Exercise helps to make the muscles firm and springy.

Has your brain ever felt worn-out when school was over? Outdoor play in the sunshine with other boys and girls rests the part of your brain you use in study and it gives work to the part that sends orders to the big muscles of your arms

and legs. Many boys and girls find that they can think better after a game or after a brisk walk in the fresh air and sunshine.

Outdoor play gives you a good appetite. Muscles that work hard use up a great deal of fuel food. When the body's supply of fuel food runs low, you begin to feel hungry. If you have a good appetite, you eat enough to give your muscles the building foods and the fuel foods they need to grow and to work hard when you play.

Muscles wear out with use. They are repaired or built up with food. When you exercise, the muscles wear out faster than they can be built up. When you rest, the muscles are built up faster than they wear out. Working muscles also give off waste faster than it can be carried away by the blood. During sleep piled-up wastes are carried away, and the muscles have a chance to repair themselves and to grow. You need eleven hours sleep each night to give your muscles enough rest.

ARE YOU DOING YOUR BEST TO MAKE GOOD USE OF YOUR BONES AND MUSCLES?

Are you training your muscles to hold your body straight?

Are you practicing the correct positions for standing and walking?

Do you sit only in chairs which allow you to place both feet flat on the floor and which give support to your back?

Are you trying to show good form in playing games?

Do you walk always with the toes pointing straight ahead?

Do you spend part of every sunny day out of doors?

Do you try hard to win when you play games, but if you lose are you good-natured about it?

Do you try to win only by obeying the rules of the game?

When you win, do you keep from boasting?

Do you try to help other boys and girls to enjoy the game?

TRY THESE TESTS

1. Complete the following sentences by supplying the missing word or words. (*Do not write in the book.*)

a. The round box of bones which guards the brain is called the __?__.

b. The __?__ __?__ is a rope of nerves running up through the spine.

c. The __?__ is a bony cage which holds the heart and lungs.

d. The bones of the hips are joined to the __?__.

e. Muscles are fastened to the bones by __?__.

f. The bones at a joint are held together by __?__.

g. The long arch of the foot is called the __?__.

h. A person with fallen arches has __?__ __?__.

2. Which of the following statements are true and which are false? Reword each false statement so as to make it true. (*Do not write in the book.*)

a. Good posture helps one to have good looks and good health.

b. In standing, the weight of the body should fall on the heels.

c. In sitting, the hips should rest against the back of the chair.

d. Exercise helps to give us a good appetite.

e. Skill in playing games is won through practice.

f. Good muscle tone depends on exercise.

g. Tired muscles need exercise.

THINK ABOUT THESE QUESTIONS

1. What are the things you do at home to help your father and mother? Which ones give you exercise? Do you ever have fun while you work? If so, what are some of the ways in which you have fun?

2. When you first meet a person, do you notice how he stands and walks? Do you notice whether he looks you straight in the eye? Do you think that good posture might help a person to win success? Give reasons for your answer.

3. Which of the following boys and girls do you think have most fun playing games? Which ones should you like to play with?

Walter, who is unhappy when his side loses in a game.

Louise, who boasts when she wins.

Tony, who plays for the fun of the game and is cheerful whether he wins or loses.

Marian, who asks boys and girls who look lonesome to join in a game.

Sidney, who always plays fair.

Sally, who goes off by herself and cries if the others do not want to play the game she wants to play.

DO THESE THINGS

1. Ask a committee of two boys and two girls to note the posture of the pupils at different times during the day: in the morning when school starts; at the end of the school day; before lunch and after lunch; before recess and after recess. Have the committee report to the class at the end of the week. Talk over in class the possible reasons for good or poor posture at different times.

2. Make a class collection of pictures illustrating good posture in different sports, such as diving, batting and running in a baseball game, and serving in tennis. Talk over in class why good form helps to make good players.

3. Study different kinds of chairs in your home, in catalogues, or in a furniture store. Describe in class the one which you think will best help you to have a good sitting posture. Give reasons for your choice. Describe the mattress which you think will help you to have a good sleeping posture. Find out what sort of pillow you should use.

4. Do you like to learn new games? Can you play these games?

hit-pin baseball	center-catch ball
prisoner's base	snatch toy
all up Indian-club run	round ball
duck on the rock	crowd ball

If you do not know how to play them, your teacher may be able to tell you how, or you may write to the National Recreation Association, 315 Fourth Avenue, New York, for directions.

5. Find out about the feet of different animals. Are there any animals that have an arched instep? Why do human beings alone have spring to the step?

6. Make a list of different games and sports in which the player may win all by himself. Make another list of the ones in which each player must do all he can to help the team to win. Talk this question over in class: Which of the two kinds of games and sports gives the better training for being a good citizen?

7. Take a lump of clay and make a statue which shows your idea of a person with good posture. Take another lump of clay and make a statue which shows your idea of a person with poor posture. Compare the two statues. What lines in your statue showing good posture are different from the lines in your statue showing poor posture? What parts of the human body do these lines stand for? Take the statue of the person with poor posture and make it into a statue of a person with good posture. What changes did you make? What changes in the shape of his body must a person with poor posture make to have good posture?

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

trunk (of the body)	tendon	sports
spinal cord	relay race	marble
breastbone	lap (of a race)	arches (of the feet)
extend	relax	balls (of the feet)
pelvis	sagging	instep
elastic	slump	flat feet
ligament	ability	muscle tone

2. Match each group of words in the list below with the word or words in the list above that you connect with it. (*Do not write in the book.*)

a tough band that holds two bones together at the joint
cloth made springy with a kind of rubber
firmness and springiness of the muscles
fallen arches
a hard white stone

UNIT VIII

Making the Most of Clothes and Shoes

A very long time ago people began to wear clothes to keep themselves warm or to protect their skins from the hot sun. But as time went on they wanted clothes to tell something about the person who wore them. By the clothes he wore it then became possible to tell a king from a soldier, a soldier from a farmer, and a farmer from a storekeeper.

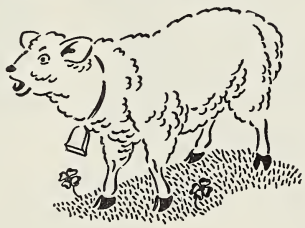
It also became possible to tell to what country a person belonged, because the natives of different countries wore different clothes. You have probably seen pictures which tell you that even today the costumes of different countries are different. But so many garments are now made in the great factories of England and America and sold all over the world that boys and girls everywhere are beginning to wear the same sort of clothes that you wear.

But clothes still tell something about the people who wear them. They tell whether a person knows what sort of clothes to wear for health and comfort and good looks.

DO YOU KNOW

Why clothes help to keep you warm?

Why wool makes warm clothing?



Why linen makes cool clothing?

Why cotton is a favorite material for underwear?

Why rubber coats and overshoes should be taken off when you go indoors?

Why a sparrow puffs out its feathers in very cold weather?

How shoes protect the feet?

What things to think about when choosing clothes and shoes?

What you may do to have good-looking clothes and shoes?

CLOTHES TO KEEP US WARM

It was a great discovery to learn that the skins of animals could be used as a sort of second skin to protect the body in cold and stormy weather. This discovery meant that human beings had found a better way of keeping warm than animals have. Many animals either have too thick a skin and too much fur to live in hot countries or too thin a skin to live in cold countries. But we find human beings with their thin skins living in every corner of the earth. They could not do this if they did not wear clothes suited to the weather.

Fur and Feathers

Do you have in your geography book pictures of people who live in places where the weather is very cold for most of the year? The people wear clothes made of the skins of animals, just as the people who first wore clothes did. Fur is the warmest clothing material there is. For this reason many people in our country wear fur coats in the winter-time.

However, you must not think of any kind of clothing material as being warm in itself. The warmth is in you. Clothes and blankets simply keep the heat of your body from escaping too fast. Have the sheets ever felt cold to you when you first got into bed on a cold winter night? In a very short time did you begin to feel cozy and warm under your blankets? Do your shoes and underclothes feel cold for a minute or so when you start dressing on a cold winter morning? The heat of your body quickly warms the sheets on your

ng ago the only
clothes worn were made
of the skins of animals

bed and the clothes you wear next to your skin. The blankets and the clothing then hold in the heat.

Air moving over your skin carries away the heat and moisture that are always escaping from your body through the skin. You have learned that when the muscles are working hard they make more heat than is necessary to keep the body at exactly the right temperature. If air did not move, the body would have a very hard time trying to lose extra heat. Air holds heat and moisture. It is only because air warmed and moistened by the body is always being pushed away by cooler drier air flowing in to take its place that the body is able to keep always at the same temperature.

You know that one way of catching fish is to catch them

Why do the Eskimos wear clothes made of fur?

Galloway

in a net. Have you ever heard of "nets to catch the wind"? Wind is just another name for air in motion. Some clothing materials act as nets to catch and hold moving air. The more air the material can hold, the warmer clothing that material will make. A clothing material that holds air allows heat to escape from the body a little at a time instead of rapidly.

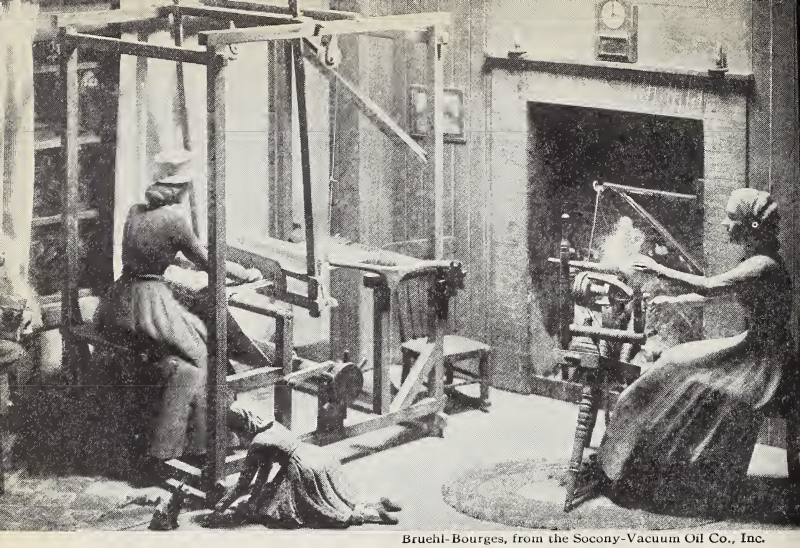
Animal hair and bird feathers catch and hold a great deal of air. Have you ever seen a sparrow puff out its feathers in very cold weather? When it does this, its feathers can catch and hold more air. The sparrow is wrapped up in a little blanket of warm air held close to its body by its feathers.

If you will hold a piece of cloth up to the light you will see that it is full of tiny holes. You may think that the more holes a material contains, the more heat will be lost from the body; but the little holes in some cloth catch and hold air. Cloth of this kind holds a blanket of air close to the body. For this reason it makes warm clothing. The thicker the material is, the more air it holds. As knitted and smooth woolen cloth catches and holds air, it makes warm clothing.

Wool

We do not know when people first learned to cut off the woolen coats of sheep, spin the wool into thread, and weave the thread into cloth. But we do know that spinning and weaving are very old arts. In the oldest stories and songs we read about the women spinning and weaving.

For thousands of years wool made the cheapest clothing for the people who lived in Europe. When settlers first



Bruehl-Bourges, from the Socony-Vacuum Oil Co., Inc.

Spinning and weaving in the early days of America.
Can you tell which woman is spinning and which one is weaving?

came to America, and for some time afterward, the only heat they had in the winter came from wood burning in great fireplaces. Later they had stoves in the kitchen and living room. All the other rooms in the house were cold. In order to keep warm in the winter the people wore heavy woolen underwear.

Today most homes, schools, and other buildings have central heating. This means that in winter heat from a furnace or a stove is sent through pipes to all the rooms of a building. It is no longer necessary to wear heavy woolen underwear indoors in order to keep warm. Most people now find that they are more comfortable and catch cold less easily if they do not wear heavy underwear all the time in the winter. When they go out of doors, they keep warm by

putting on woolen sweaters or coats *over* their suits and dresses instead of wearing woolen clothes *under* their suits and dresses. By doing this they can more easily put on or take off extra wraps according to the temperature of the place where they happen to be.

CLOTHES TO KEEP US COOL

Find the country of Egypt in your geography book. In the old days Egypt was called "the gift of the Nile." This was because the river Nile spread rich black earth over the land during the summer floods. The people had only to stir up the muddy fields with a stick and scatter the grain over them to have harvests that gave back to them a hundred times more grain than they had sown. As the people did not have to work very hard for their food, they had time left over to do many other things.

They learned how to make glass and a sort of paper and dishes and furniture and many other beautiful and useful articles. They invented a kind of writing and divided time into years and months and days. They built great cities and monuments that people from other countries still go to Egypt to see. One of the first things they did was to find out how to make clothes that were more comfortable to wear than the skins of animals.

Roberts

What clothing is keeping these boys warm on a cold winter day

Linen

The people of Egypt needed clothes more for protection against the heat than for protection against the cold. First they wove different sorts of grasses and leaves to make garments. No one knows how long it took them to find out that the soft strong fibers, or threads, in the stalk of the flax plant may be woven into a cool beautiful cloth. We call this cloth linen.

Linen does not hold much air. Moving air slips in and out easily through the little holes in the cloth. For this reason sheets and garments made of linen are delightfully cool in the summer. A snowy linen tablecloth makes the table look inviting. As linen takes up moisture easily, it makes a good material for towels and handkerchiefs. But pure linen is an expensive material. Even in the old days "purple and fine linen" was spoken of as the dress of princes. Fortunately we have another clothing material which is much cheaper and almost as cool as linen. This material is cotton.

"King Cotton"

A snowy ball of soft fiber, or thread, is wrapped around the seeds of the cotton plant. This fiber is called lint. When the seeds are ripe, the balls of lint are caught up by the wind and scattered far and wide. The way in which its seeds are scattered makes the cotton plant one of the most useful plants in the world.

Just as soon as people learned that the soft lint of a cotton ball might be spun into thread and the thread woven into cloth,

"...ng ago in the land of Egypt people wore cool linen clothing

they began to pick the balls instead of letting the wind carry them far away. People did not learn to make cloth out of cotton lint as early as they learned to make linen out of flax fibers. We are told that the people who lived in India had cotton clothes about twenty-five hundred years ago. But it was not until the thirteenth century that cotton cloth began to be manufactured in Europe.

When white men first came to America, they found that the Indians in some places had cloth made of cotton. The growing of cotton came to be the greatest industry of the southern part of the United States. So many people earned their living because of the way in which the seeds of the cotton plant are scattered that this plant came to be called "King Cotton."

Moving air passes easily through the little holes in both knitted and smooth cotton material. It is also easy to wash. For these reasons cotton is a favorite material for underwear and for suits and dresses to be worn in hot weather. White people who go to the tropics for work or play usually wear light cotton clothing.

A CHANGE OF AIR FOR THE SKIN

We change the air inside our bodies by breathing in and out about eighteen times a minute. We change the air in a room by having a window open top and bottom. The air next to our skins under our clothes also needs to be changed. When we wear clothes that let very little air reach the skin, we feel very uncomfortable.

Cloth which is woven tightly does not easily take up moisture from the

From a painting by Velasquez

This little princess, who lived long ago in Spain, wore a hoop skirt

skin and prevents moisture from evaporating. The best material for underclothing is cloth that takes up moisture and lets air reach the skin. Knitted or loosely woven cotton is a good material for underwear. In places where it gets very cold in the wintertime, it may be necessary to have underclothes made of a mixture of cotton and wool.

Rubber coats and rubber overshoes allow very little air to reach the skin. If you will hold up a raincoat to the light you cannot see any little holes in it. In order to be waterproof a raincoat must also be airproof. In rainy or snowy weather it is important to protect your clothes and shoes from the wet by wearing a raincoat and rubbers or galoshes.

But rubber coats and overshoes should be taken off as soon as you go indoors. If they are left on in a warm room, you will soon begin to feel hot and damp because fresh air cannot reach your skin to evaporate moisture and carry away heated air. When you finally take them off or go outdoors again, the rapid evaporation of moisture may make you feel chilly. Then you are likely to catch cold.

CHOOSING CLOTHES

Styles in clothes change with the passing years. At one time sleeves were so long that they had to be tied up to keep them from dragging in the mud. In the sixteenth century, when Queen Elizabeth ruled over England, the women wore collars called ruffs. These ruffs were made stiff with wire and were spread out over round flat pieces of wood. The women looked as if their heads were being carried on platters.

In later times women began to wear wire frames under their skirts to make the skirts stand out. This kind of skirt was called a hoop skirt. The skirts

Topical

Princess Elizabeth of England with her mother, the Queen. Do the clothes worn by the present-day princess look more comfortable than the clothes worn by the princess of long ago?

were so big around that ladies sometimes could not pass each other in the narrow streets. Some boys and girls may find in their attics today the hoops that their great-grandmothers once wore under their skirts.

In the nineteenth century people thought that women who had tiny waists were the prettiest. Dresses were drawn in so tightly around the waist that the women could hardly breathe. Even little girls were laced in tightly so that their waists would grow small. The boys were not obliged to have small waists, but they had to wear tight trousers.

Today we think that clothes should be made to fit the people who wear them, not that the body should be made to fit clothes. Both our work and play clothes and our party clothes give all the muscles of the body plenty of room in which to move.

New Clothes

Ben and Edna were going to visit their grandmother in the country. Their father said they might buy two new play suits apiece to take with them. In the store they picked out several suits to try on. Edna liked one of the suits very much. It seemed to fit her perfectly. As she stood in front of the mirror admiring herself, she happened to take a deep breath. Then the suit felt too tight. A little frown appeared on her face.

"Don't you like the suit?" asked Mother.

"I love it," said Edna. "But it pinches when I take a deep breath."

"You take a great many deep breaths when you play," said Mother.

"I know it," said Edna. "Perhaps I'd better not buy this suit."

Ben was trying on his suits in the little room next to Edna's. Edna called to him. "Have you tried to take a deep breath in your suits, Ben?" she said.

"No, but I will," said Ben.

Both children bought suits that would let them take deep breaths without pinching them.

Clothes should allow all the muscles of the body to move easily. When you pitch a ball, you do not want to have such tight sleeves that your arm cannot throw the ball hard and strong and straight. When you breathe deeply and fast while running, you want clothes that will give your lungs room enough to take in all the air you need.

In trying on new clothes in a store take a good deep breath to make sure that the clothes will give your lungs plenty of room in which to stretch. When you are being measured for a new suit or a new dress have your chest measure and waist measure taken while you are holding a deep breath. Then your clothes will not feel too tight when you are playing and working and your lungs will have room to do their work.

Steven A. Coons

"Take a deep breath—hold it!" Will this girl be able to breathe deeply in her new dress?

If you pinch a rubber tube between your fingers, you can hinder the flow of water through the tube. The tubes called blood vessels, through which blood travels through the body, may be pinched by tight collars, belts, or garters. Then the flow of blood through the blood vessels is hindered.

Your bones are growing. Clothes and shoes that are too tight may make your bones grow out of shape. It is a good rule never to wear clothes or shoes that pinch you anywhere no matter what you are doing.

SHOEING THE FEET

People first wore shoes to protect the soles of their feet from hot or cold or stony ground. We still wear shoes as a protection. Shoes keep the feet from being cut or bruised. In hot weather they keep the feet from being burned by hot pavements, and in the winter they protect the feet from cold.

In the southern part of the United States and in other places where the weather is warm for most of the year, shoes protect the people from a disease called hookworm. The eggs of the hookworm leave the body of a person who has the disease in wastes from the large intestine. The eggs hatch out in the ground. If a person walks barefoot over the ground, very young and very tiny hookworms may get into his body by boring their way through the skin of his feet. They then find their way to the small intestine, where they increase in numbers and live for many years. Hookworm disease makes people pale, weak, and tired all the time. It stunts the growth of children. Wearing shoes keeps people from getting the disease.

Styles in Shoes

The first shoes had soles only. We call these shoes sandals. Sandals were first made of grass woven together or of strips of animal hide or of flat pieces of wood. The sandals were bound to the feet by pieces of leather or rope. The sandal became a shoe when material was added to the sole in order to cover the whole foot.

The shoes we wear today had their beginnings far back in history. Rich people began to wish their shoes as well as their clothes to tell how important they were. The shoemakers who made shoes for the great lords and fine ladies thought up all sorts of new designs for boots and shoes. Sometimes a king or a queen had shoes made to hide badly shaped feet. Then this kind of shoe became the style, as all the lords and ladies wished to be like the king or queen.

At one time it was the style to wear shoes with long narrow toes. The more important a person was, the longer were the toes of his shoes. At last the toes became so long that they had to be tied to the knees so that the person who wore them could walk. These shoes used up so much material that laws were made saying that shoes could not be more than a certain length.

People thought so much about the style of their shoes that they did not pay much attention to making shoes comfortable. They tried to make their feet fit their shoes instead of trying to make shoes fit their feet. It was not until about one hundred and fifty years ago that a pair of shoes had a right shoe and a left shoe. Until then a shoe could be worn on either foot. Nowadays much more attention is given to the problem of making shoes fit the feet.

Steven A. Coons

Drawing an outline of the foot before going to buy a new pair of shoes

Shoes That Hurt the Feet

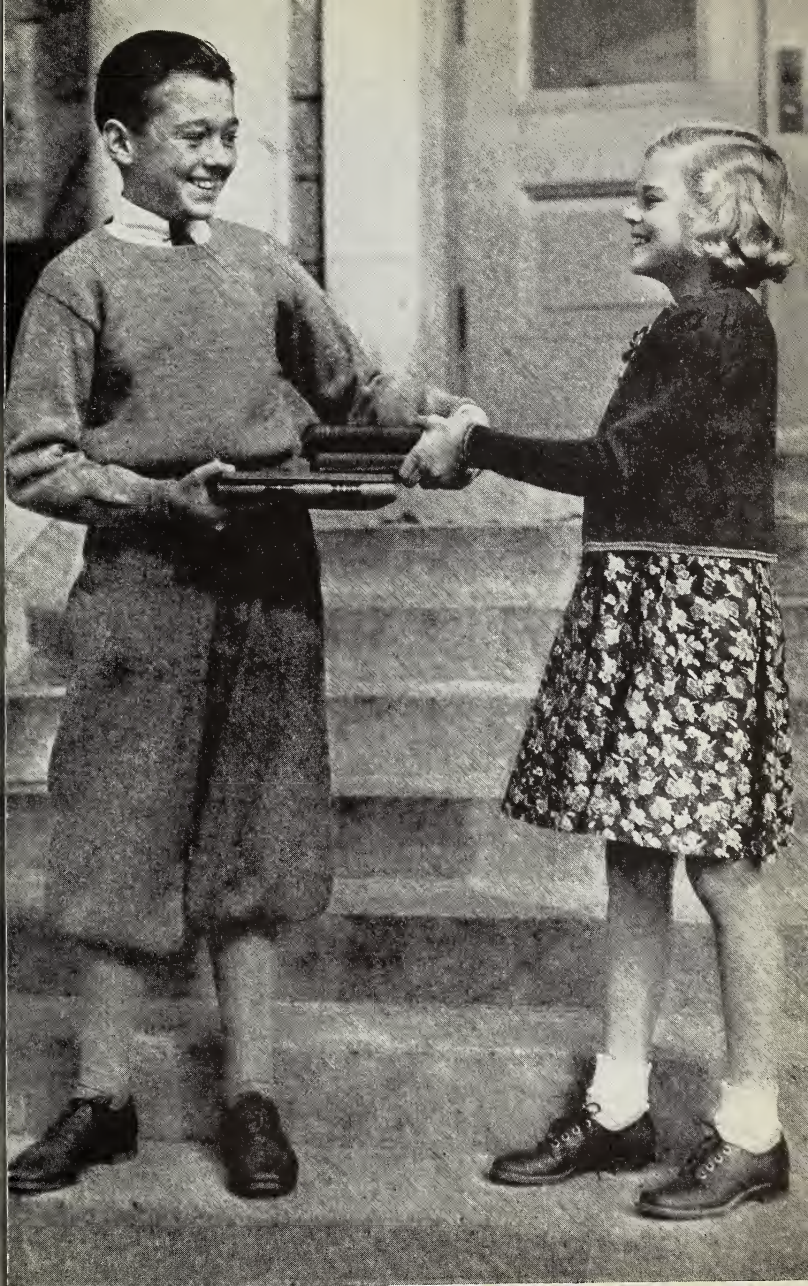
Have you ever had a pair of new shoes that did not exactly fit? A shoe that hurts the foot makes the one who wears it feel miserable all over. After a while the foot may force the shoe into a shape which is comfortable for it. But before this happens, the shoe may cause a blister or a corn or a callus or a bunion or an ingrowing toenail.

A corn or a callus is a patch of hard dead skin. A corn has a little point in the center like the sharp point of a grain of corn. A shoe pressing on the corn forces the hard point against nerves in the foot. This is why a corn hurts. Corns and calluses are formed when a tight shoe rubs or presses against the skin of a toe or some other part of the foot. High heels crowd the toes up against the tip of the shoe. For this reason high-heeled shoes may cause corns and calluses.

Bunions are painful swellings at the large joint of the big toe on its inside edge. They are caused by shoes that are too short for the length of the foot or by shoes that are pointed at the tip.

What things did this boy and girl know about shoes when they bought the ones they are wearing?

Roberts



Buying New Shoes

Because of the harm that may be done to the feet by badly fitting shoes, everyone should know what things to notice in buying a new pair. A shoe should be one-half inch longer and one-quarter inch wider than your foot when you are standing up. This is the way to find out if a shoe is large enough for your foot. Take off your shoe and place your foot on a clean sheet of white paper. Draw an outline of your foot on the paper. Now place the shoe over the outline of your foot and draw an outline of the shoe. If the shoe line comes outside the line of your foot, the shoe is large enough.

When you go to buy a new pair of shoes, you may take with you outlines of both feet. Some shoe stores now have X-ray machines which show the bones of the feet. By using this machine the shoe salesman can see whether the shoes he tries on your feet will give your bones plenty of room. A shoe that fits too tightly crowds the small bones of the foot. Then your feet hurt, and you cannot enjoy walking or playing games.

When you try on new shoes, try on both shoes. No two feet are alike in size. One foot may be larger than the other. Stand with the weight of your body first on one foot, then on the other, and last of all on both feet. A new shoe may feel comfortable when you are sitting down; but when you stand up, your foot spreads out in length and width.

A shoe should have the same shape as the foot. When you make an outline of your bare foot, you will notice that the line around your toes is rounded. Notice also that the line

Putting clothing and shoes to air before going to bed

Steven A. Coons

from the inside edge of the heel to the inside edge of the big toe is straight. Your shoe should have an inside straight line to match your foot.

A shoe should have a shank that bends easily. The shank is the narrow part of the sole of the shoe between the heel and the ball of the foot. The long arch of the foot rests directly over the shank of a shoe. The shank should fit snugly under the arch. This helps to support the arch. If the shank bends easily with each movement of the foot, the muscles and ligaments that hold up the long arch have a chance to exercise and become strong.

The heel of a shoe should not be more than one inch high. It should be as broad as the heel of the foot and should not get narrow at the base. A broad heel supports the ankle and helps to keep it from bending or moving from side to side. It is much easier to walk in shoes with broad low heels.

Stockings and socks also should fit the feet. Stockings which are too long are apt to press or rub against the skin and cause calluses. Short stockings as well as tight shoes may crowd the bones of the foot. Ingrowing toenails also may be caused by stockings that fit too tightly. Ingrowing toenails are very painful. The pain comes from the pressing of the sharp edge of the nail into the soft flesh.

Steven A. Coons

"These shoes will go shining to school

When you cut your toenails use clean scissors and take great care not to cut the flesh of your toes. Be sure to cut the nails straight across and even with the ends of the toes. Never cut them in at the corners, as this may cause ingrowing toenails. The nails should be smoothed with a nail file after cutting. Powder sprinkled in the spaces between your toes after a bath will help to keep them dry and prevent cracking.

TAKING CARE OF YOUR CLOTHES AND SHOES

You have learned that the clothes worn next to your skin soak up perspiration. Your underclothing and stockings should be washed often in order to keep them clean and sweet-smelling. Many boys and girls of your age have learned to wash out their own underwear and stockings. Underclothing and stockings should first be washed in warm soapsuds and then rinsed in clear water until all the soap has been removed. If possible, hang them outdoors to dry.

Outside clothing catches dust and dirt. You do not feel that you are looking your best if your clothes are dirty or wrinkled or torn. Clothes that are made simply, of materials that will wash, are the best clothes to wear for school. If you have suits or dresses that cannot be washed, they should be aired and brushed often.

After you have undressed for bed and put on your night clothes, hang up all your day clothes where they will get a good airing. Place your shoes where they will air and dry out thoroughly during the night. You can keep your coats and your suits or dresses from getting wrinkled by

hanging them on coat hangers as soon as you have taken them off.

Before starting for school, look yourself over to make sure that your clothing is neat and clean. Remember to take a clean handkerchief with you. Brush your coat and hat, if they look dusty. See that your shoes are shined. Shoe polish is cheap, and it helps to keep the shoes from wearing out quickly. Many boys and girls brighten up their shoes with shoe polish every morning before they start for school.

In most schools each pupil has his own place to hang up his hat and coat. Do you have a special hook in a cloakroom or wardrobe or locker where you hang your outdoor clothes? Can you tell why it is important for you to hang your coat or sweater and hat only on your own special hook?

ARE YOU DOING YOUR BEST TO MAKE YOUR CLOTHES AND SHOES HELP YOU TO HAVE HEALTH, COMFORT, AND GOOD LOOKS?

Do you wear clothes that suit the weather?

Do you remove your coat or sweater when you go indoors?

Do you protect your clothes and shoes by wearing a raincoat and rubbers or galoshes on rainy or snowy days?

Are you careful not to wear clothing that is too tight?

Do you wear shoes and stockings that fit your feet?

Do you change your underwear at least twice a week?

Do you place your day clothes and your shoes where they will get a good airing during the night?

Do you wear neat clean clothes to school?

Do you keep your shoes shined?

When you get to school do you hang up your hat and coat on your own special hook?

1. Match each group of words in the list below with the word in the box that you connect with it. (*Do not write in the book.*)

bunion	corn	shank
linen	fur	wool

the warmest clothing material
a clothing material that makes warm underwear
cloth made of the fibers of the flax plant
a patch of hard dead skin with a little sharp point in the center
a swelling of the large joint of the big toe
the narrow part of the sole of the shoe between the heel and the ball of the foot

2. Which of the following actions are wise and which are foolish? Give the reasons for each choice. (*Do not write in the book.*)

a. Wearing underclothing that takes up moisture and lets air reach the skin.

b. Wearing clothing suited to the weather.

c. Keeping on rubbers, coats, and overshoes indoors.

d. Thinking only of style in choosing clothes and shoes.

e. Seeing whether you can take a deep breath without feeling uncomfortable when you are trying on a new suit or dress in a clothing store.

f. Trying on both shoes when buying a new pair.

g. Wearing shoes with high heels.

h. Wearing stockings that are shorter than the feet.

i. Airing and brushing clothes that cannot be washed.

j. Keeping the shoes well shined.

k. Hanging up your hat over another person's hat.

THINK ABOUT THESE QUESTIONS

1. What sort of clothes do you wear on a cold day? a hot day? a rainy day? In what ways are you protecting your health when you take off outdoor wraps upon coming indoors? In what ways are you protecting your health when you wear a raincoat and galoshes on a rainy day?

2. What are the things to think about in choosing underwear? What is the difference between the winter underwear that most people wear today and the winter underwear worn by the early settlers in the northern part of America? What is the reason for this difference?

3. If you were asked to go with a four-year-old or a five-year-old child to a shoe store in order to select a pair of shoes for him, what points would you think important in choosing the shoes?

DO THESE THINGS

1. Get a newspaper and measure the number of square inches of advertising space given to clothing, food, and furniture. How many square inches are given to each one? What does this study tell you about people's interest in clothes? Why are people interested in clothes?

2. If you can find in a library or in your attic old illustrated magazines of the nineteenth century or the early part of the twentieth century, compare the clothes shown in the illustrations and advertisements with the clothes shown in the magazines of today. Can you think of any reasons why styles in clothes change? Do you think the clothes worn today are better-looking and more healthful than the clothes worn in the nineteenth century and the early part of the twentieth century? Give reasons for your answer.

3. Make an outline map of North America and on it show the regions which grow the most cotton and the regions which raise the most sheep for wool.

4. Choose either wool or cotton or linen and find out everything that happens to it on the farm, on its way to the factory, and in the factory, so that you can tell a little story about cotton, linen, or woolen cloth from farm to factory.

5. Notice the feet of people as you walk along the street. Do many of the people point their toes out instead of straight forward? Do many wear high-heeled shoes? Do the people who wear low-heeled shoes and walk with the toes pointed straight ahead have better posture than those who toe out and wear high heels? Draw pictures showing how the position of the feet in standing and the kind of shoes worn make a difference in posture.

6. Turn back to page 32 and read again the story of the two boys who went to ask for a job. Make a play from this story and give it in class. In the play show why one boy gets the job rather than the other.

7. If you have a museum in your town or city, visit it and look at the things which show how people lived in other periods of history. Notice especially the kind of clothes and shoes they wore and the kind of houses they had. The members of the class may wish to make a little museum of their own to illustrate the things they are learning in geography, history, and health class. The boys and girls in many schools are doing this. They invite their parents and the boys and girls in other grades to visit the museum when it is finished.

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

fashion	ruff	shank	hoop skirt
spin	miserable	settler	hinder
flax	callus	central heating	ingrowing toenail
fiber	bunion	industry	
lint	X-ray machine	hookworm	

2. Make sentences, using blanks which can be filled by using words from the list of words above. Exchange your sentences with those of another pupil and complete the sentences he or she has made.

UNIT IX

On the Lookout

The wisest man in the world can neither manufacture a live chicken that can lay an egg nor an egg from which a live chicken can hatch. But the most foolish man in the world can kill a chicken or break an egg. Life is the one thing that no human being can make but that all human beings can destroy. It is not brave to run the risk of losing your life in order not to be called a 'fraid cat or coward when someone dares you to do a dangerous thing that will do no one any good. If you know that a thing is dangerous to do, it is not brave to do it unless it is part of your job or unless you can save someone's life by doing it.

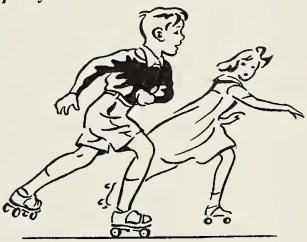
You may never have a chance to show your skill and bravery and strength by saving someone's life. But you may be the means of saving many people from being hurt or killed by helping to prevent accidents. In great forests there are lookouts who watch for the very small beginnings of fires that may burn up a whole forest unless they are put out in time. We may all be on the lookout to keep accidents from happening. We cannot manufacture life, but we may do our best to make life safer and more comfortable for ourselves and other people.

DO YOU KNOW

What safety habits will keep you safe on the street and highway?

How to choose a safe place to play?

Why it is dangerous to play running games on the sidewalk?



How to play Watch Your Step?

The principal cause of fires that destroy life and property?

How to be a safe swimmer?

What to do to get ready for a vacation?

Some good hot-weather foods?

How to avoid sunburn?

What poison ivy looks like?

How to guard against snake bite?

Ruth was going to start for school for the first time. Her mother was very busy and could not go with her.

"Bob will take me," said Ruth. Bob was a big boy who lived on the same street. He was in the fifth grade. Ruth admired him very much. Bob passed by Ruth's home on his way to school.

When Ruth saw Bob coming down the street, she ran to meet him.

"I'm going to school with you," she said proudly.

"That's fine," said Bob. "I'll show you the quickest and safest way to go. I worked it out by myself. I can get to school five minutes quicker by taking the streets where the traffic isn't so thick."

"What's traffic?" asked Ruth.

"See the automobiles going along the street," said Bob. "Automobiles and busses and streetcars and bicycles moving along a street are traffic. People walking are part of the traffic, too."

Ruth and Bob came to a corner where they had to cross a street.

"This is the only busy street we must cross," said Bob. "Do you see the light up there on a pole? That is called a traffic light."

"The light is red," said Ruth.

"Yes, and a red light means 'Stop,'" said Bob. "You must never cross a street when the light is red. Do you see all the automobiles waiting to cross the street just as we are waiting? They cannot cross while the light is red."

"But some people are crossing," said Ruth.

Galloway

The traffic policeman helps boys and girls to walk safely to school

"They are foolish people," said Bob. "It is not their turn to cross the street. They might get killed or hurt by the automobiles going up and down the street they are crossing."

"The light has changed to green," said Ruth.

"Now it is our turn to cross the street," said Bob. "Always remember that in our town the red light says 'Stop' and the green light says 'Go.'" He took Ruth's hand. Then he looked to see whether any automobiles were going to turn the corner. He kept a sharp lookout all the way across the street.

Bob and Ruth had to cross the street in front of their school building. A policeman stood at the street crossing.

"That is Officer Flynn," said Bob. "He's the school traffic officer." Bob told Ruth to watch what Officer Flynn did. "See how he uses his hands to tell people what to do?" said Bob. "When he holds up his hand with the palm turned out in your direction, you must stay on the sidewalk. When he motions to you with his hand, then you may cross."

On the sidewalk near the curb stood boys with white belts. They kept the school children on the sidewalks until Officer Flynn motioned to them to cross the street.

"Those boys belong to the Schoolboy Patrol," said Bob. "They're all in a higher grade than I am. They help Officer Flynn to prevent accidents to school children. I hope I'll belong to the Schoolboy Patrol some day."

Forming Habits of Safety

Little children are just learning safety habits. They look up to older boys and girls. If they see these boys and girls crossing streets only at the corners and obeying the traffic lights and the traffic officers, they are likely to form these safety habits, too. Safety habits are helping more and more each year to keep boys and girls safe.

Not long ago there was a bad fire in a school. In the newspapers the next day there was an exciting story about the way in which the pupils had behaved. The story told how they marched quietly out of the burning building with their teachers just as if they were having a fire drill. Not a child or a teacher was hurt. These children had learned exactly what to do in case of fire. They had so often prac-

Galloway

What safety habit has not yet been formed by these boys?

ticed the things to do that when a real fire came they did these things almost without thinking.

You have fire drills so that you will form the habit of doing the right things when there is a real fire. Do you know the reasons for fire-drill rules? Why must everyone stop talking at once? Why should every pupil stand still just where he is when the alarm sounds? What are the reasons for all the other things he does?

Your teachers drill you in school in the things you must do to leave a burning building safely. But you must drill yourself in the habits that will keep you safe when you are in the streets. Every three minutes in our country a child is injured in an automobile accident, and every two hours a child is killed. If you obey the following safety rules, you

will soon form habits that will help to keep you safe when you are walking on the street or highway and when you ride in trolley cars or busses.

1. Cross streets only at corners. Obey traffic signals and the traffic officer.
2. Do not do the following three things that cause most accidents to boys and girls: running into the street from behind a parked car; dashing suddenly into the street; stealing a ride on the back of an automobile or a truck.
3. Face front when you get off a streetcar or bus. Wait until the street is clear before crossing to the curb after getting off a trolley car.
4. When riding in a school bus, keep your seat and do not talk loudly. Wait until the bus stops before getting on or off.
5. When riding a bicycle, obey the traffic rules which all vehicles must obey. Never give a child a ride on the handlebars.
6. Coast only on safe hills where there is no traffic.
7. Do not play on railroad tracks or trestles. Stop, look, and listen at a railroad crossing, and make sure that the tracks are clear in both directions before crossing.
8. When walking on a road which has no sidewalk, walk always on the left side of the road *facing* the traffic coming toward you.
9. Do not ask a stranger to give you a ride in his automobile.

Can you give reasons for these safety rules? Can you think of any other rules that will help you to keep safe on streets and highways?

SAFETY IN PLAY

Do you like to be interrupted when you are playing a game? Can you play a game better if you give your whole attention to the game instead of having to keep one eye on

Gendreau

In this city playground boys may have fun climbing

something else? Boys and girls who play baseball and tag and other games in the city streets have to stop their play to wait for cars to pass. Sometimes they forget all about safety when catching a ball or chasing a playmate.

Automobile drivers usually slow up when they see children playing in a street. But sometimes a child will dart out into the street from behind a parked car or a tree. The driver of a passing car may not be able to stop in time to keep from hitting the child.

Bill and Alex were playing a game of pitch and catch on the sidewalk. Bill threw a wild ball. Without stopping to

think, Alex dashed out into the street after it. A truck coming down the street knocked Alex down and broke his arm. Who was to blame for the accident? Bill who threw the wild ball? Alex who ran into the street to catch it? Or the truck driver who could not stop in time to keep from hitting Alex? Perhaps the real reason for the accident was that the boys were playing ball near a street where automobiles and trucks were always passing.

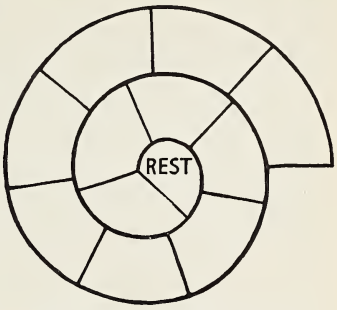
If you live in the country or in a small town, it is usually possible to find a place to play where you will not be bothered by passing traffic. In big cities there are usually schoolyards, playgrounds, play streets, or parks where boys and girls may play games and have fun without danger from passing vehicles.

Sidewalk Games

There are many sidewalk games that may be played without having to step off the sidewalk into the street. One good sidewalk game is called Watch Your Step. The players make a circle with one player in the center. The players making the circle take turns in tossing a beanbag at the feet of the player who stands in the center. The center player must move about very quickly to avoid having the beanbag touch his feet. The person who succeeds in hitting the feet of the center player takes his place.

Another sidewalk game is called Snail Hopscotch. The court is drawn in the shape of a snail in twelve blocks. The players in turn hop on one foot to a block marked REST without touching any lines of the court. The player may rest on two feet in the rest block. Then he hops

back to the starting place. If a successful trip is made, the player may place his initials in any one of the twelve blocks except the rest block. Each player must hop into every block except those that have initials. Each player may rest in the block that has his initials as well as in the rest block. It is a foul to step on a line of the court or to put both feet on the ground while hopping.



The court for snail hopscotch

Do you know any other sidewalk games? What makes a game a good game to play on the sidewalk?

A Playground Safety Club

Three of the younger children in Riverton School were hurt on the playground in one week. The principal of the school asked the boys and girls of the upper grades to help to make the playground safer for the children in the lower grades. A meeting was held in the school assembly hall to talk over plans. One boy said that the small children got hurt because they were always in the way when the older children were playing games. One of the girls said that some of the little children got hurt because they did not know how to use the slides and swings and teeters properly.

Finally, the upper grades decided to form a playground safety club. The club then elected a committee of five

boys and five girls from each grade to make the playground safe for the younger children. These boys and girls were to serve for one month. Then another committee was to be elected. A part of the playground was marked off for the children in the lower grades so that they would not be "under the feet" of the older boys and girls. The members of the committee taught the children new games.

The committee also made some rules for using the slides and swings and teeters. Here are the rules they drew up:

Swings

Only one child to a swing.
No standing on the board of the swing.
Keep your eyes open!

Slides

Sit facing front when sliding down.
Use the steps to go up.
Only one child at a time on the steps.

Teeters

Face each other.
Tell your partner before getting off.

Members of the committee took turns watching the children at play. If they found something wrong with a slide or swing or teeter, they reported it to the principal. The children were not allowed to use it until it was fixed.

Do you have a playground safety club in your school? If not, should you like to start one? What games are safe to play on a crowded playground? Do you think football, baseball, and shooting arrows at a target would be safe games?

FIRE

One of the very first important discoveries that human beings made was how to use fire and to make it work for them. Fire is one of our greatest friends, but it may turn into an enemy if we do not know how to use it safely.

Each year a large number of people in this country lose their lives in fires. The principal cause of fires is carelessness in handling matches and cigarettes. Little children sometimes find matches and strike them as they have seen older people do. The fire from the matches may set their clothing or the room on fire. This is why matches should always be placed in a metal box high up where little children cannot reach them.

Older children should not light fires unless they have been taught how to do it properly. The only safe place for a campfire or a bonfire is an open space away from trees and buildings and cleared so that the fire cannot spread to the grass or bushes. A bonfire or campfire should never be left to go out by itself. Use plenty of water or sand or damp earth to put out the fire. *Always be sure it is out before leaving the place.*

Never go close to an open fire if you are wearing

Steven A. Coons

Putting matches on a high shelf where little sister cannot reach them

light thin clothes that may catch fire easily. If your clothing should ever catch fire, do not run for help, but lie down and roll over slowly on the ground, or wrap yourself in a coat, blanket, or rug. Fire cannot burn without air. Running with the clothes afire fans air into the flames. Wrapping up in a coat or rug or rolling on the ground puts out the fire by cutting off the supply of air.

Boys and girls may help to prevent loss of life and serious damage to property by knowing how to turn in a fire alarm. The directions for doing this are printed on the fire-alarm box. If you do not know how to turn in an alarm, stop the next time you pass a fire-alarm box and memorize the directions on the box. Then you will not lose time by having to stop and read the directions if sometime you have to send in an alarm.

After turning in an alarm stay by the box until the firemen come so that you can tell them where the fire is. Then stay out of the way. Do not try to enter a burning building. You will only hinder the work of the firemen who have been trained to fight fires and to rescue people. You may get badly hurt.

WATER

Water, like fire, is a friend that may turn into an enemy if it is not treated with respect. Good swimmers and people skilled in handling boats know this. Every boy or girl who goes in or on the water should learn and practice the following rules of safety and good manners:

1. Never swim in water over your head unless a good swimmer is in the water with you. Do not go swimming alone even if the water is shallow.

2. Before going in swimming in a strange place, find out how far out you can walk before the water is over your head, and whether there are any deep holes or hidden rocks on the way to deep water.
3. Even if you are a strong swimmer, never try to swim across a lake or river unless someone trained to save life in the water goes with you in a boat.
4. Never call for help in the water unless you are really in trouble. When a swimmer comes to help you, do not grab him. Keep your head and do exactly as you are told. It is a good plan to practice how to be saved from drowning as well as how to rescue a drowning person.
5. Do not yell or fool about in the water or duck or tease friends who are not good swimmers.
6. Do not go in swimming for two hours after eating. Never go swimming at night unless the bathing place is brightly lighted and a lifesaver is keeping watch of the swimmers.
7. Stay in the water for only half an hour at a time. Wipe yourself dry immediately after a swim, and put on your clothes or a dry bathing suit.
8. Do not dive unless you have been taught how to dive properly. Never dive in unknown, shallow, or rocky waters.
9. When you go out in a rowboat or canoe, sit quietly in your place. Do not lean over the side of the boat or rock it or change places with anyone. If you have a chance, learn how to manage a boat and what to do if the boat tips over.

A SAFE AND HAPPY VACATION

In the old Greek story told by Aesop about the ant and the grasshopper, the ant worked all summer long storing up food for the winter. The grasshopper did nothing but sing and play. When the grasshopper said to the ant, "Let's go on a picnic," the ant cried, "Oh no, oh no! Winter is coming. I must work while I may."

When the ant said to the grasshopper, "Help me carry this wheat to the barn," the grasshopper cried, "Oh no, oh no! Summer is here. The sun is shining; I must play and sing while I may."

One frosty winter morning the ant was dragging out some of the wheat he had laid by in the summertime. The starving grasshopper begged the ant to give him a little bit. "What were you doing this last summer?" asked the ant.

"Oh," said the grasshopper, "I was not idle. I kept singing all the summer long."

The ant laughed and shut up his barn. "Since you could sing all summer, you may dance all winter," he said.

In some old books of Aesop's Fables the following saying appears at the end of the story of the ant and the grasshopper: "Winter finds out what summer lays by." Your great-grandmother may have read this story to your grandfather when he was a little boy. The story was supposed to teach boys and girls to be industrious. Nowadays we agree with the ant that there is a time for work. But we also agree with the grasshopper that we are not being idle when we sing and play in the summertime.

Most of all we agree with the old saying, "Winter finds out what summer lays by." Summer vacation is the time to lay by supplies of the sunlight vitamin and strength and rest and happy memories. What you do in the summer makes a great difference in your ability to work and play and grow all through the year.

Most boys and girls are as eager to have the school year begin again as they were to have it end. They are ready to tackle with fresh, clear minds and strong bodies the work and play of another school year.

Getting Ready for Your Vacation

You look forward to your vacation as a time to enjoy yourself. But it is not fun to be sick or hurt or mosquito-bitten or poisoned with poison ivy or badly burned by the sun. The people who have the most fun on a vacation are the ones who learn beforehand how to keep things from happening that might spoil their fun. They learn also how to get as much good as possible from a vacation.

Before going away from home on a long vacation trip it is a good idea to visit both your dentist and your doctor. The dentist will fill any holes in your teeth which may cause toothache later. The doctor will examine you to make sure that you are in good condition to do all the things you plan to do. He may wish to vaccinate you against smallpox and to protect you from typhoid fever.

If you are to spend much time hiking, camping, or motoring, carry a first-aid kit. You can buy one in almost any drugstore. It should have in it gauze bandages, cotton, adhesive plaster, a pair of blunt scissors, and a small bottle of iodine. Leave the cotton and bandages in their covers until you need to use them.

If you cut or scratch yourself, wash the cut place with warm water and soap to get all the dirt out. Then paint the cut with iodine. If the cut is deeper than a scratch, cover it with a gauze bandage after the iodine has dried and fasten the bandage in place with adhesive plaster. If you cut yourself badly, have a doctor take care of the wound. He will do everything he can to keep the wound from becoming infected. The most dangerous wounds are the ones that are deep or badly bruised and torn at the edges.

Vacation Health Habits

Many boys and girls try to crowd into the first days of a vacation all the things they have looked forward to doing. Have you ever been so stiff and sore and sunburned at the beginning of a vacation that you had to spend several days getting well again? It is a good idea to start your good times slowly. Take time out to rest.

Do you like to lie in the warm grass and look up at the sky through sunlit leaves? Have you ever spent a lazy half hour watching dragon flies darting over a pool, or butterflies floating from flower to flower? Do you like to lie on the sand at the seashore and listen to the waves or watch to see how far each one rushes up on the shore? There are hundreds of interesting things to see and hear in the summer just by sitting still.

After having had your lunch it is a good plan to take a nap in a cool bedroom or in a hammock under the trees. You can have much more fun in the cool of the afternoon if you have rested during the hottest part of the day. Have you noticed how sleepy you feel after you have spent most of the day out of doors? At night most boys and girls are ready for bed at their regular bedtime hour.

Wherever you spend your vacation, do not forget what you have learned about the foods that help you to grow strong and healthy. It is best not to eat too much during hot weather. Eat plenty of salads and cooked vegetables, fruit, brown bread and butter, and cereals, and drink plenty of milk. When you feel thirsty, drink cool pure water, or a fruit drink, such as orangeade or lemonade.

Seeing interesting things in a quiet pool

Steven A. Coons

Boy Scouts of America

These boys know that their drinking water is pure

"

You know that the water you drink at home and in school is safe to drink. But when you go away from home on hikes or motor trips or camping trips, you do not know whether the water you find along the way is pure. Water may look perfectly clear and yet contain the germs of typhoid fever or other dangerous diseases.

If you are to stay at a farmhouse or a country hotel or a camp during your vacation, ask your parents whether they have found out that the drinking water is pure. Boil water from brooks, lakes, or roadside springs before drinking it. Another way to make water safe is to add three drops of iodine to a quart of water and let it stand for half an

hour. If you stop at tourist camps on a motor trip, find out where the camp water comes from. If it comes from a community water-supply system, it is usually safe to drink. If it comes from a well or spring, it is best to boil it, as you cannot be sure that the water is pure. Never drink water from a common drinking cup. The water may be pure, but harmful germs may have been left on the rim of the cup by other users.

The milk you drink should come in bottles and be marked "pasteurized." If it is impossible to get pasteurized milk, the milk should be boiled for five minutes and then cooled.

Sunning Yourself

During the workaday part of the year most people spend a great deal of time indoors. Vacation is the time to give yourself a good sunning. Boys and girls who come back to school with a fine coat of sun tan look as if they had enjoyed themselves. Summer sunlight shining on the bare skin has also helped to make them healthier.

Tan is formed as a screen to keep the hot rays of the sun from burning the flesh that lies under the outside layer of skin. If a person stays out in the summer sun for too long a time before this coating of tan is formed, his skin may be badly burned. This kind of burn is called sunburn. The skin becomes very red and later blisters. Sunburn is very painful. Sometimes it makes a person so ill that he is obliged to stay in bed.

At the beginning of summer protect yourself from the direct rays of the sun from the middle of the morning to the middle of the afternoon. If the day is very hot, play

in the shade. Get used to strong sunlight a little at a time. A good way to do this is to take sun baths. When you take your first sun bath, lie in the sun for fifteen minutes with only your face, arms, and legs bare. On the next day uncover your chest and back as well as your arms and legs, and stay in the sun for fifteen minutes. Each day afterward you may increase by five minutes the amount of time you allow the sun to shine on your bare skin. The skin will look a little red after the first sun baths. Then it will begin to tan. After the skin is tanned, there is no danger of sunburn.

In case you do get badly sunburned, any pure oil or cold cream rubbed on the skin is soothing. Some peo-

"

Will this boy look as if he had had a good time when he goes back to school in the fall?
Roberts

ple get freckled instead of tanned by the sun. They must be more careful about protecting themselves from the sun than people whose skins tan easily.

IN THE WOODS AND FIELDS

The woods and fields hold many treasures. But there are dangers to be avoided in the fields and woods as well as treasures to be found. If you live in the country, you probably know what these dangers are. Perhaps you have explained them to friends from the city who did not know about them.

Touch Me Not

Have you ever heard this warning, "Leaflets three, let it be!"? "Leaflets three" is the sign of a plant called poison ivy. This plant is very common in the country east of the Rocky Mountains. It is usually found trailing over stone-walls and creeping through underbrush. On the Pacific coast a plant of the same family is known as poison oak. Both plants can easily be recognized by the form of the leaf, which is divided into three leaflets. After the leaves have fallen in the autumn, the plant is still dangerous. It may then be recognized by its greenish-white berries, which last into the winter.

From within a few hours to two or three days after touching the leaves of poison ivy or poison oak, the skin becomes red and swollen. Then small blisters that itch and burn begin to make their appearance. Scratching spreads the poison to other parts of the body. Some people poison

so badly that they may have to stay in bed for several days. Other people may escape with a lighter case of poisoning. But even a mild attack of ivy poisoning is very uncomfortable.

If you know that you have touched poison ivy, the best thing to do is to wash immediately the part of the body touched by the ivy with yellow or brown laundry soap and hot water. Then rinse the skin with alcohol and wash it again. The soap helps to dissolve and remove the poison. If you have touched the leaves of poison ivy with your hands, be careful not to spread the poison by rubbing your face or arms or touching any other part of the body until you have thoroughly washed your hands. If poison-ivy leaves have brushed against your clothes, wash your hands in soap and water after removing your clothes. The clothes should be washed as soon as possible with soap and hot water. Shoes and clothing that cannot be washed should be thoroughly aired. It is a good idea to wash with soap and water after every trip through woods and fields where poison ivy grows. You can never be sure that you have not touched it.

Study this picture so that you may recognize poison ivy when you see it growing

It is now possible for a doctor to put something into the body which will protect

a person from poison ivy. If you poison badly and are going hiking or camping, your doctor may wish to protect you in this way.

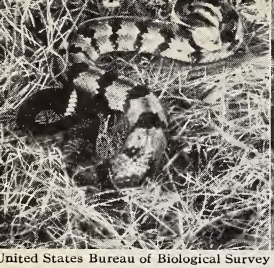
There are many plants and berries and fruits to be found in the woods and fields that are good to eat. Food fit to eat is called edible. There are also many plants and berries that are poisonous. It is safest never to eat anything you find growing in the country, unless an older person who knows has told you that it is edible.

Disturb Me Not

While staying on a farm or while you are hiking or camping, you may come across snakes. Most snakes in our country are harmless. Farmers like to have them around because they eat troublesome insects. However, a few snakes are poisonous. The three most common poisonous ones are the rattlesnake, the copperhead, and the water moccasin. Pictures of these snakes are shown on page 240.

Boys and girls who live in the country usually know the poisonous snakes in their community. If you live in the city and plan to go to the country for your vacation, find out what poisonous snakes may be found in the place you expect to visit. If you have a zoo in your city, go to the snake house and learn to recognize these snakes.

Poisonous snakes have two long hollow teeth called fangs. When a snake bites a person, it stabs through the skin with its fangs and then lets the poison flow into the wound. A snake seldom attacks a person unless it has been frightened or disturbed. In order to strike with its fangs, a snake must have half its body on the ground. It rarely



United States Bureau of Biological Survey

A rattlesnake

The Brooklyn Museum

A copperhead

United States Bureau of Biological Su

A water moccasin

strikes a person above the knees. If you are hiking through woods where poisonous snakes are common, wear leather leggings or high leather shoes. In climbing trees or over stonewalls be on the lookout for snakes. Do not reach your hand down into tall grass or underbrush without first looking.

If you plan to go to a place where rattlesnakes or copperheads are common, it is a good idea to carry a snake-bite outfit. This may be bought in a drugstore. Take it with you when you go into the fields and woods. Directions for using come with the outfit.

In case someone is bitten by a snake, send at once for the nearest doctor. It is necessary for the victim to keep quiet. Running or walking makes the snake's poison spread faster through the body. If the victim must be taken to a doctor's office or hospital, he should be carried. By using a medicine called antivenom serum doctors can now cure snake bite, if the serum is given soon enough.

In order to give real help and perhaps to save a life in case of an accident, you must keep cool so as to think what to do. The first thing to do is to get a doctor. When you study first aid, you will learn what to do before the doctor arrives.

Keep Me Away

If you go away on your vacation, you may come to places where there are many flies and mosquitoes. It is a good idea to take mosquito netting with you on a vacation, so that you can at least keep mosquitoes from annoying you when you are in bed.

Stay away from soda fountains, restaurants, and other eating places where there are many flies or where the people who serve the food appear to be unclean. Let people know, as pleasantly as you can tell them, that you do not like dirt or flies. People in business must please their customers. If you object to flies, you are helping to encourage food-sellers to get rid of flies.

ARE YOU DOING YOUR BEST TO MAKE LIFE SAFER FOR YOURSELF AND OTHER PEOPLE?

Are you teaching good safety habits to younger children?

Are you practicing the safety rules that will help to keep you safe on the street or highway?

Do you build bonfires or campfires only in places where the fire cannot spread and always make sure that the fire is out before leaving it?

Do you know how to turn in a fire alarm?

Do you follow the rules of safety and good manners when you are in or on the water?

Do you paint small cuts or scratches with iodine?

Do you boil all water that you do not know to be pure?

Do you get used to strong summer sunlight a little at a time?

Are you able to recognize poison ivy, and do you wash yourself with yellow soap and warm water when you have been in a place where poison ivy grows?

Do you avoid eating growing things unless you have been told by an older person that they are edible?

Do you keep on the lookout when you are walking in places where poisonous snakes are common?

Do you keep away from soda fountains and eating places where there are many flies or which appear to be unclean?

1. Which of the following statements are true and which are false? Reword each false statement so as to make it true. (*Do not write in the book.*)

a. Fire drills are held in schools in order to help the pupils to form the habit of doing the right things when there is a real fire.

b. One of the three things that causes the most accidents to boys and girls is crossing a street at the corner.

c. When walking on a road which has no sidewalks, walk always on the right side.

d. You can have more fun and learn to play a game better in places where you will not be interrupted by passing automobiles.

e. Football is a good game to play on a crowded playground.

f. The principal cause of fire is carelessness in handling matches and cigarettes.

g. The best thing to do when one's clothing catches fire is to run for help.

h. It is never safe to go swimming alone.

2. Some of the following things to do will help you to have a safe pleasant vacation. Others may spoil your vacation. Which are good, and which are bad? Give reasons for your choices. (*Do not write in the book.*)

a. Getting used to the sun a little at a time until the skin is tanned.

b. Boiling all drinking water that you do not know to be pure.

c. Drinking from a cup someone else has just used.

d. Drinking only pasteurized milk.

e. Visiting your doctor and dentist before going away.

f. Eating plenty of fruits and vegetables.

g. Drinking bottled "pop" or sodas when you are hot and thirsty.

h. Staying up late to go to the motion pictures or to enjoy the summer night.

i. Walking through the woods in low sneakers in a place where poisonous snakes are common.

j. Protecting yourself at night from mosquito bites by putting mosquito netting over the bed, if the windows are unscreened.

k. Painting cuts, scratches, and insect bites with iodine.

l. Acting cross if your family cannot send you to a place where you would like to spend your vacation.

m. Helping to make vacation pleasant for other people as well as for yourself.

THINK ABOUT THESE QUESTIONS

1. John, Ralph, and Dick were just learning to swim. One day they went bathing in a lake near a state highway. John went out over his head. Ralph, forgetting that he could not swim well, rushed out to help John. Soon both boys were in trouble. Dick realized that he was not a strong swimmer and could not possibly save the boys. He ran to the road to get help. He came back very quickly with a man who rescued both boys. Who was the real hero? Why?

2. Mabel, Ned, and little Rose were in the living room. A fire was blazing merrily in the fireplace. Ned had taken the screen from the fire in order to toast marshmallows and had forgotten to put it back. Rose was bouncing her ball. The ball bounced over toward the fireplace. Rose ran to get it. Just then a log fell forward in the fireplace. A long curling flame leaped out and set Rose's thin cotton dress on fire. She began to scream and run about the room. Mabel opened the door and called for help. Ned pulled Rose to the floor and rolled her up in the rug.

Can you tell why Mabel did a dangerous thing in opening the door? Why was Rose's action foolish? Why was Ned's action wise? What were the causes of the accident?

1. Make a map to show the safest route for you to take to school. On the map show all the streets you cross, the location of traffic lights or traffic policemen, and railroad crossings or trolley-line crossings, if any.

2. From your police department find out the number of deaths and injuries to people on foot which happened in your community last year. The next time you see the story of such an accident in your newspaper, clip it out and bring it to class. Talk over in class the causes of the accident. How could it have been prevented? List all the rules people on foot should obey in order to keep from having accidents.

3. Invite a Boy Scout or a Girl Scout who is in high school, or a Scout leader, to show the class how to make a person start breathing again after he has stopped breathing because of an accident. If you are old enough, you may like to join a group, such as the Boy Scouts or Girl Scouts, which teaches its members how to save life and what to do before the doctor comes when someone has been hurt in an accident.

4. Weigh and measure yourself at the beginning and at the end of your vacation. How much have you grown? Which health habits helped you to grow?

5. Talk over your vacation plans in class. Make a list of the things you will need to do on your vacation in order to avoid accidents and sickness. What are the things you will need to do to rest mind and body? What must you do to gain in health and strength?

1. Be sure that you know the meaning of and can pronounce correctly the following words or expressions:

alarm	common drinking cup	copperhead
vehicle	ability	water moccasin
trestle	typhoid fever	fangs
industrious	adhesive plaster	snake-bite outfit
lifesaver	gauze bandage	antivenom serum
condition	edible	police department

2. Write a sentence telling what you think of when you see each one of the following words or group of words. (*Do not write in the book.*)

fire alarm	industrious	edible food
railroad trestle	gauze bandage	copperhead
common drinking cup		police department

BOOKS TO READ

Andress, J. Mace, and Goldberger, I. H. *Broadcasting Health.* Ginn and Company, Boston, 1933.

This is a story of boys and girls who spent a year in trying to understand better the part that food plays in healthy living. There are several chapters which you will like to read, such as those headed: "Which is Better for Health, Candy or Fruit?" "Can You Order an 'A' Lunch?" "The Story of Cooking," "Learning from the Wild Animals at the Zoo," "Solving a Mystery," "Jack and Jill."

Andress, J. Mace, and Goldberger, I. H. *The Health School on Wheels.* Ginn and Company, Boston, 1933.

A jolly group of boys and girls do their very best for health. In company with their teacher they travel around their home city, called in the story Brightville. Uncle Jim, who works on the newspaper, accompanies them. The book is his story. He tells about the visit of the group to model dairies, restaurants, factories, barber shops, and fire stations. Along the way, they learn how to take better care of their health and to help their school and community.

Baldwin, James. *An American Book of Golden Deeds.* American Book Company, New York, 1907.

Stories that have to do with saving lives at sea.

Craig, Gerald S., and Condry, Margaret G. *Learning about Our World.* Ginn and Company, Boston, 1932.

Unit VIII of this book, which is called "Around Us," tells how light, heat, and water, all play a part in healthful living.

Donnelly, Grant L. *Alcohol and the Habit-Forming Drugs.* Alfred Williams and Company, Raleigh, North Carolina, 1936.

This little volume written for boys and girls tells about the effects of alcohol and drugs on the human body. It contains 44 illustrations.

Hallock, Grace T. *After the Rain.* Cleanliness Institute, New York, 1928.

This is a book of stories about children in many different countries and the things they do to keep themselves and their clothes and their homes clean.

Hallock, Grace T., and Abbot, Julia Wade. *Hob o' the Mill.* The Quaker Oats Company, Chicago, 1927.

This tells the interesting story lying back of the steaming dish of oatmeal which you eat for breakfast. The illustrations are in color.

Holway, Hope. *The Story of Water Supply.* Harper & Brothers, New York, 1930.

This is a simple story of the way man has obtained his water supply.

Quennell, Marjorie and C. H. B. *Everyday Life in Roman Britain.* G. P. Putnam's Sons, New York, 1925.

As you read about bathing in Unit I, you may like to know something about the Roman baths that were built in Britain hundreds of years ago. See pages 55–60.

Wadsworth, Ruth F. *The Banana Comes into Its Own.* The United Fruit Co., Boston, Mass.

In this little book a doctor of medicine tells about the value of the banana as a food for both the healthy and the sick.

The Book of Knowledge. The Grolier Society, New York.

This is a handy book for general reference.

Compton's Pictured Encyclopedia. F. E. Compton & Co., Chicago.

This very interesting set of volumes may be used with almost every unit of this book. Look up "Pasteur," "Eye," "Ear," "Nose," and "Shoes."

Hygeia. The American Medical Association, Chicago.

This is a monthly magazine which you will want to look over every month if for nothing else than its pictures. You will also enjoy the stories, poems, and puzzles. *Hygeia* is found in most libraries.

Safety Education: A Magazine of the Good Adventure. Chicago.

You will find good fun in looking over this monthly magazine. There are puzzles, stories, poems, and pictures about safety. Many of them are written by children. There are also news stories about the safety work that is being carried on in many schools by children.

The World Book Encyclopedia. W. F. Quarrie and Company, Chicago.

There are many questions on growth which are answered in these books. Among them are questions like the following: Why do we not groan like an animal when we are hungry? Who started the idea of cold storage? Will the world's food supply ever run short?

HEALTH WORDS

You may use this list of words as you would a dictionary. It contains the words you will need to know the meaning of as you read this book. Following the explanation of each word you will find the number of the page on which it is first mentioned.

Adenoid: the tonsil located near the place where the nose opens into the throat; the nasal tonsil; it is often called adenoids (p. 130)

Adhesive plaster: a kind of tape that is sticky on one side, which may be used to fasten a bandage over a cut (p. 231)

Air sacs: tiny elastic bags in the lungs in which the smallest branches of the windpipe come to an end (p. 145)

Alcoholic beverage: a drink, such as whisky or beer, which contains alcohol (p. 156)

Anoint: to rub with oil (p. 12)

Antivenom serum: a medicine used by doctors to cure a person who has been bitten by a poisonous snake (p. 240)

Aqueduct: a huge pipe, often a tunnel, usually built of stone or concrete, which leads water into a city or town (p. 8)

Audiometer: a machine, or instrument, used to measure hearing (p. 117)

Ball of the foot: the rounded part of the sole toward the inside edge of the foot, back of the toes (p. 175)

Bladder: the organ in which urine is held until it is ready to be removed from the body (p. 78)

Blood stream: the blood flowing through the blood vessels (p. 75)

Blood vessels: the tubes through which blood runs through the body (p. 36)

Board of health: the group of persons in a community whose duty it is to protect the health of all the people (p. 149)

Breastbone: the long flat bone at the front of the chest to which the front ends of the ribs are fastened (p. 164)

Bunion: a painful swelling at the large joint of the big toe (p. 204)

Calcium: a mineral present in certain foods, especially milk, that helps to build bones and teeth (p. 66)

Callus: a patch of hard dead skin (p. 204)

Carbohydrates: fuel foods, the sugars and starches, which are burned in the body to make heat (p. 64)

Carbon dioxide: a waste gas made when the body cells burn fuel foods; it is removed from the body through the lungs (p. 77)

Cell: one of the tiny living parts of which the body is made (p. 77)

Central heating and ventilating system: a system for supplying all the rooms in a building with warm, moist, moving air (p. 161)

Chest: the bony cage, made up of the spine, ribs, and breastbone, which holds the heart and lungs (p. 164)

Circulate: to flow in a circle. The blood circulates through the body from the heart and back to it (p. 36)

Circulation: moving in a circle; the movement of the blood through the blood vessels (p. 40)

Citrus fruits: a group of fruits, of which oranges, grapefruit, and lemons are examples (p. 70)

Cleanliness: being clean (p. 2)

Communicable disease: a disease caused by germs which may spread from one person to another; a disease that is catching (p. 19)

Community: a place and all the people who live in it. A town or city is a community (p. 3)

Condition: when the doctor can find nothing wrong with your body he says that you are in good condition (p. 231)

Constipated: not having a daily bowel movement (p. 75)

Copperhead: a poisonous American snake (p. 239)

Corn: a patch of hard dead skin on the foot with a hard sharp point in the center (p. 204)

Curd: the thick protein material in sour milk; it is used in making cheese (p. 65)

Cuticle: the skin about the nails (p. 47)

Dermis: the inside layer of the skin; the true skin (p. 34)

Digest: to change food within the body into very simple materials which can be used by the body (p. 57)

Digestion: the act of digesting food (p. 74)

Digestive juices: juices poured out into the mouth, stomach, and small intestine which help to digest food (p. 74)

Digestive system: the mouth, stomach, small intestine and other parts of the body which help to digest food (p. 74)

Ear specialist: a doctor who has made a special study of the ears (p. 117)

Eardrum: a film which closes the lower end of the tube leading into the ear from the outside (p. 117)

Edible: fit to eat (p. 239)

Elastic: a material that springs back quickly after it has been stretched (p. 163)

Epidermis: the outside layer of the skin (p. 34)

Eustachian tube: the narrow tube leading from the middle ear to the place where the nose opens into the throat (p. 122)

Evaporate: to pass into the air in the form of a mist which is usually too fine to be seen, or to cause water to do so (p. 39)

Evaporated milk: canned milk from which part of the water has been removed (p. 85)

Evaporation: the act of evaporating (p. 39)

Expand: to become larger (p. 40)

Eye specialist: a person who has made a special study of the eyes. People go to an eye specialist to have their eyes examined (p. 102)

Eyestrain: eyes that are tired because they have not been used properly or because they need the help of glasses are said to be suffering from eyestrain (p. 114)

Fangs: the two long hollow teeth of a poisonous snake through which poison is put into the body of a person bitten (p. 239)

Fats: fuel foods, such as butter and the fat of meat, that are burned in the body to make heat (p. 60)

Fiber: a strong material shaped like a fine string or thread (p. 195)

Film: a very thin layer of material. The picture taken by a camera is made on a film put in the camera (p. 95)

First-aid kit: a box containing materials to be used when someone is hurt in an accident (p. 231)

Fish-liver oils: oils pressed from the livers of fish; cod-liver oil is a fish-liver oil (p. 71)

Flat feet: feet in which the bones in the arches have slipped out of place, so that the arches have become flattened. A person with fallen arches is said to have flat feet (p. 163)

Flax: a plant which supplies the soft, strong fibers from which linen is made (p. 195)

Fuel foods: foods that are burned in the body to make heat; the fats and the carbohydrates (p. 62)

Gas: air is made of several different kinds of gases. One of the gases in air is oxygen (p. 77)

Gauze bandage: a bandage made of a kind of cloth, called gauze, which has been heated to kill any germs that may have been on it (p. 231)

Generation: the period of time separating parents from their children. You are in one generation, your parents in another (p. 2)

Germs: very small plants or animals which can be seen only by looking at them through a microscope. Some are helpful or at least harmless; others cause disease (p. 19)

Habitation: dwelling place; home (p. 15)

Habit-forming drug: a drug which is likely to form a habit in the person who uses it (p. 152)

Hair pit: the tiny pit deep down in the true skin out of which a hair grows (p. 42)

Hair root: the part of a hair growing in its little pit deep down in the true skin (p. 41)

Hangnail: a piece of skin hanging loose at the edges of a fingernail, caused by a break in the cuticle (p. 47)

Hard of hearing: not being able to hear well (p. 122)

Health officer: a person in a community who does the things necessary to protect the health of all the people (p. 149)

Heart: the organ of the body which pumps blood through the blood vessels (p. 36)

Hookworm: a disease caused by tiny worms that enter the body through the skin, usually of the feet (p. 202)

Hoop skirt: a skirt made to stand out from the body by a wire frame worn under it (p. 199)

Industrious: busily engaged in work (p. 230)

Infection: a cut or a part of the body in which germs have begun to work and grow in number is said to be infected or to have an infection (p. 125)

Ingrowing toenails: toenails that grow into the flesh at the ends of the toes (p. 204)

Inner ear: the part of the ear in which the nerves are located which carry sound messages to the brain (p. 122)

Instep: the long arch of the foot (p. 175)

Iris: the part of the eye which makes the pupil larger or smaller and is colored brown or blue or gray or hazel (p. 90)

Iron: a mineral present in certain foods, especially egg yolks and liver, that is needed by the body (p. 66)

Joint: any place in the skeleton where one bone joins another bone (p. 166)

Kidneys: two small bean-shaped organs, located one on each side of the backbone, which remove liquid waste materials from the blood (p. 77)

Large intestine: the part of the digestive system where food that has not been digested is kept until it is ready to be passed out of the body (p. 75)

Laxative: a medicine to make the bowels move (p. 57)

Lens: the curved glass in eyeglasses that helps people with eye faults to see clearly (p. 104)

Lice (singular, *louse*): small insects that sometimes get into the hair (p. 45)

Ligament: a tough band which fastens one bone to another bone at movable joints (p. 166)

Lint: the soft, strong fiber in which the seeds of the cotton plant are wrapped (p. 195)

Liquid: anything that pours easily, such as water or milk (p. 35)

Liquid soap: soap dissolved in water (p. 44)

Long arch (of the foot): several small bones joined together to form an arch reaching from the heel of the foot to the ball (p. 175)

Lungs: the two organs in the chest where the oxygen you breathe in passes into the blood and the carbon dioxide you breathe out passes out of the blood (p. 57)

Magnifying glass: a glass which makes things appear to be larger than they really are (p. 34)

Malaria: a disease caused by a certain kind of germ which is spread from one person to another by a certain kind of mosquito (p. 26)

Medical science: knowledge gained by the study of ways to cure and to prevent disease (p. 16)

Microscope: an instrument which makes it possible for us to see things, such as germs, too small to be seen by the eyes alone (p. 20)

Middle ear: the tiny space across which sound messages travel from the eardrum to the inner ear (p. 122)

Milk sugar: the sugar present in milk (p. 64)

Minerals: materials that are usually solid, such as gold, silver, calcium, phosphorus, table salt, rocks, and the like. The minerals present in food are used by the body in many different ways (p. 66)

Mucus: the thick liquid which comes from the nose (p. 126)

Muscle tone: when the muscles are firm and springy, they are said to have good tone (p. 163)

Nail root: the part of a fingernail or toenail which grows under the skin (p. 42)
Nasal tonsil: the adenoid (p. 130)
Nearsighted: not being able to see faraway things clearly (p. 102)
Nerves: the living fibers over which messages travel to and from the brain (p. 36)
Normal temperature: the temperature of the healthy body; 98.6 degrees Fahrenheit (p. 38)
Nostrils: the openings of the nose which you can see (p. 126)

Obstacle: something which stands in the way or blocks a passageway (p. 144)
Ointment: a greasy material containing medicine, used to rub on sore places on the body (p. 110)
Organ: a part of the body which has a special kind of work to do for the good of the whole body. The kidneys and the heart are organs (p. 77)
Oxygen: a gas present in air which you must breathe in order to stay alive (p. 77)

Pasteurized milk: milk that has been heated to kill any harmful germs it may have contained (p. 69)
Pediculosis: persons who have lice in the hair are said to have pediculosis (p. 45)
Pelvis: the group of heavy bones joined together in the shape of a saucer to which the lower end of the spine is fastened (p. 164)
Perspiration: the salty liquid poured out on the surface of the skin through pores; sweat (p. 33)
Phosphorus: a mineral present in milk and other foods that helps to build bones and teeth (p. 66)
Pneumonia: a serious disease of the lungs (p. 148)
Poison oak: a plant of the poison-ivy family which grows on the Pacific coast (p. 237)
Pores: the openings of tiny pipes beginning far down in the dermis through which perspiration, or sweat, flows out on the surface of the skin (p. 34)
Posture: the form in which the body is held in walking, standing, sitting, working, and playing games (p. 162)

Prism: a three-cornered piece of clear glass which breaks up a beam of light into rays of different colors (p. 92)

Protective foods: foods, such as milk and cod-liver oil, which contain the vitamins that help to protect the body against colds and other illnesses (p. 84)

Proteins: materials present in such foods as milk, cheese, meat, and eggs, which are used in the body for building and repair (p. 65)

Pupil: the round opening through which light enters the eye (p. 90)

Pus: the thick white or yellow matter which comes from a part of the body that is infected, such as an infected cut or an infected middle ear (p. 126)

Quarantine: keeping well people away from a person who has a communicable disease by placing a sign on the door of the sick person's home (p. 149)

Radiation: the passing of heat from a heated surface into the surrounding air. Heat is lost from the skin by radiation (p. 38)

Raw materials: the materials out of which anything is made (p. 60)

Reflection: the turning back of light from a surface which is not transparent (p. 94)

Relax: to allow oneself to become limp; to rest (p. 167)

Relay race: a race in which each one of several runners on a team runs for only part of the whole distance (p. 168)

Retina: the part of the eye at the back on which light rays reflected from an object make a picture of the object (p. 95)

Roughage: coarse material in food that helps to make the bowels move (p. 69)

Sagging: drooping (p. 171)

Saliva: the digestive juice in the mouth which changes starch to sugar (p. 74)

Scalp: the skin covering the head (p. 42)

Schoolboy Patrol: a group of older boys in a school who stand on the sidewalks near the curb and keep school children on the sidewalks until it is safe for them to cross the street (p. 220)

Science: the study of the world about us. The study of the human body is a part of science (p. 16)

"Seeing eye": The Seeing Eye is a society that trains dogs to be guides for blind people (p. 108). A dog so trained is sometimes called the "seeing eye" of his master (p. 89)

Shampoo: the act of washing the hair (p. 43)
Shank: the narrow part of the sole of the shoe between the heel and the ball of the foot (p. 208)
Skeleton: all the bones of the body joined together (p. 163)
Skull: the round bony covering of the brain (p. 164)
Slump: to have a drooping posture (p. 171)
Small intestine: the tubelike part of the digestive system where food goes just after it has left the stomach (p. 74)
Snake-bite outfit: a box containing materials to be used when a person is bitten by a poisonous snake (p. 240)
Sound wave: a wave made in the air by anything that vibrates and produces a sound (p. 117)
Spinal cord: the rope of nerves running up through the spine to the brain (p. 164)
Spine: the column of small flat bones running up the middle of the back; the backbone (p. 164)
Stomach: the part of the digestive system where food goes just after it has been swallowed (p. 41)
Sugar cane: a plant the sap of which is used to make sugar (p. 64)
Sunshine vitamin: vitamin D (p. 70)

Tendon: a tough cord which fastens a muscle to a bone (p. 167)
Tone of the body: when the muscles are firm and springy, the tone of the body is said to be good (p. 179)
Tonsils: small fleshy bunches in the throat which catch and usually destroy germs (p. 117)
Traffic: the flow of vehicles and people along a street or road (p. 218)
Traffic light: a light which changes in color to show drivers of vehicles and people walking when they may or may not cross a street (p. 218)
Traffic officer: a police officer who directs traffic (p. 220)
Trestle: a bridge for carrying a railroad track over a valley or stream (p. 222)
Trunk: one of the four main parts of the body; the others are the head, arms, and legs (p. 164)
Tuberculosis: a serious communicable disease caused by a special kind of germ which usually attacks the lungs (p. 148)
Typhoid fever: a communicable disease caused when certain germs, usually carried in food or drink, get into the intestine (p. 231)

Uncleanliness: not being clean (p. 14)
Urine: the liquid waste removed from the blood by the kidneys (p. 78)

Vibrate: to move rapidly back and forth; to quiver (p. 119)
Vitamin D: the vitamin which is made by the body when summer sunlight shines on the bare skin. Fish-liver oils are rich in vitamin D (p. 70)
Vitamin-D milk: milk which has been made rich in vitamin D (p. 71)
Vitamins: materials in food that help you to grow and keep healthy. Each vitamin has a letter of the alphabet for its name (p. 57): A, p. 68; B, p. 69; C, p. 69; G, p. 71

Water moccasin: a poisonous water snake (p. 239)
Water-supply system: a system for carrying water through pipes into a community from one or more large bodies of water (p. 235)
Whey: the part of milk which is mostly water (p. 64)
Windpipe: the tube which carries the air we breathe from the throat to the lungs (p. 119)

X-ray machine: a machine which makes it possible to look through skin and flesh so as to see the outlines of the bones (p. 206)

INDEX

Key to the Sounds

ă *as in* at	ē *as in* be	ō *as in* note
ā *as in* ate	ẽ *as in* her	ô *as in* horse
ä *as in* father	ĭ *as in* bit	oi *as in* oil
â *as in* care	ī *as in* bite	ŭ *as in* us
ĕ *as in* bet	ŏ *as in* not	ū *as in* use

Accidents, 220
Adenoid (ăd'ē noid), 130, 143
Air, 22, 77, 124, 190; in body, 142, 145; fresh, 155, 197
Air sacs, 145
Alcohol, 156, 238
Ankle, 166
Appetite, 78, 180
Apples, 67
Apricots (ā'prĭ kots), 66
Aqueducts (ăk'wē dŭkts), 8
Arches, 175, 176, 208
Arms, 164
Athens, 4
Audiometer (ô dĭ ŏm'ē ter), 128

Backbone, 77, 164
Bacon, 61
Ball of foot, 175
Bananas, 67
Bandage, gauze, 231
Bath, 12, 15, 16, 36, 40; sun, 236
Bathtub, 6, 22
Beans, 65, 66
Beverage (bĕv'ẽr ĭj), alcoholic, 156
Bicycle-riding, 222
Bladder, 78
Blindness, 97, 108, 110
Blister, 35, 204
Blood, 36, 37, 39; carries food, 37, 41, 74; in lungs, 145
Blood vessels, 36, 74, 142, 145, 157, 202
Body, parts of, 164
Boiling water, 21, 234
Bones, 66, 68, 164, 166, 202
Bonfire, 227
Books, 103
Bowels, movement of, 69, 75, 76
Brain, 95, 121, 164, 179
Bread, 64, 74; whole-wheat, 67; whole-grain, 76, 81; brown, 233
Breastbone, 164
Breathing, 80, 146, 200
Bunion, (bŭn'yun), 204
Butter, 61, 67, 233

Cabbages, 67, 70, 81
Calcium (kăl'sĭ um), 66, 70
Callus (kăl'us), 204
Campfire, 227
Canoe, 229
Carbohydrates (kär bō hī'drāts), 64
Carbon dioxide (kär'bŏn dī ŏk'sīd), 77, 145
Carrots, 67, 70, 81
Castor oil, 76
Celery, 67, 70
Cells, 77
Cereals (sēr'ē alz), 64, 67, 68, 74, 233; for teeth, 81
Chapped hands, 48
Cheekbones, 105
Cheese, 65, 71
Chest, 164
Chewing, 74, 79

Chill, 156
Choking, 144
Cigarettes, 227
Citizen, good, 8, 106, 153
Citrus (sĭt'rus) fruits, 70
City, clean, 26
Cleanliness, 4, 14, 16
Clothes, 189, 193; choice of, 199; care of, 207, 209
Clothing on fire, 228
Club, safety, 225
Cod-liver oil, 71, 155
Coffee, 81
Cold cream, 47, 48, 236
Colds, 143, 146, 148; care of, 149; prevention of, 153, 154
Color, 90, 92, 95
Comb, 45
Communicable (ko mū'ni ka b'l) diseases, 19, 149
Communities, clean, 25
Constipated (kŏn'stĭ pāt ĕd), defined, 75
Copperhead, 239
Corns, 204
Cotton, 195
Cough, 144, 146, 153
Cream, 60
Crusts, 81
Cups, drinking, 21, 235
Curd (kĕrd), 65
"Cures," 149
Cuticle (kū'tĭ k'l), 47
Cuts, 231

Dentist, 80, 156, 231
Digestion, 41, 74
Digestive system, 74, 78
Dirt in eye, 106
Diseases, 14, 16, 47, 68; communicable, 19, 149
Dishes, 21, 154
Diving, 229
Doctor, 149, 151, 231
Drugs, 152
Dust, 142
Dusting, 22

Ear, middle, 122, 125, 132; inner, 122, 132; outside, 132
Ear wax, 133, 134
Earache, 126
Eardrum, 121, 124, 126
Ears, care of, 132, 134
Eating, 78, 79
Eggs, 40, 60, 65, 67, 155; yolk of, 66
Elbow, 166
Electric lights, 103
Epidermis (ĕp ĭ dĕr'mĭs), 34
Epsom salts (ĕp'sum), 76
Eustachian (ū stā'kĭ an) tube, 122, 124, 125
Evaporation (ē văp ō rā'shŭn), 39
Examination, health, 156
Exercise, 79, 155, 178
Eye chart, 101
Eyeball, 90, 94
Eyebrow, 105
Eyeglasses, 102
Eyelashes, 105
Eyelids, 105
Eyes, 90, 97; protection of, 98, 105, 106; testing, 101

Fangs, 239
Fats, 60, 61, 62, 64
Feathers, 191
Feet, 156, 174, 202; flat, 175
Fever, 38, 153
Fiber, 195
Fingernails, 42, 43; care of, 47, 48
Fingers, 43, 166
Fire, 227
Fire alarm, 228
Fire drill, 221
Fireworks, 108, 110

First-aid kit, 231
Fish, 65
Fish-liver oil, 71
Flax, 195
Flies, 14, 22, 23, 241
Food, 20, 23, 37, 40, 41; digestion of, 73, 74, 75; flavor of, 160
Food groups, 60
Foods, fuel, 62; fried, 79; protective, 155
Foot, 175
Forehead, 105
Franklin, Benjamin, 13, 15, 104
Freckles, 41
Fruit, 40, 78, 233
Fruit juices for colds, 152
Fruits, 60, 76, 155
Fuel, 77
Fuel foods, 62, 180
Fur, 189

Games, 79, 224
Garbage cans, 25
Gas, 77, 145
Germs, 19, 20, 22, 110; on fingers, 20; in eyes, 110; in ears, 125; of colds, 143, 148; spreading of, 153, 154
Glare, 98
Glasses, drinking, 21
Glasses for eyes, 102, 103; dark, 98
Good form, 169, 171
Grains, 64, 65, 68
Grapefruit, 70
Growth, 65
Gums, 68, 69, 80, 81
Gymnasium, Greek, 6

Hair, 35, 41; care of, 43; of animals, 191
Hair pits, 41
Hair root, 41
Hairbrush, 45
Handkerchief, 111, 153, 210
Hands, 20, 48, 76
Hangnail, 47
Hats, 47
Head, 164
Headache, 75
Headlights, 97
Health, board of, 149
Health officer, 149
Hearing, 121, 124; testing of, 127, 128; loss of, 134
Heart, 36, 38, 80
Heat, 37, 38, 145, 157
Heating system, 161, 192
Heels, 204, 208
Hips, 164
Honey, 64
Hopscotch, snail, 224

Indians, 197
Infection (ĭn fĕk'shun), 125
Instep, 175
Intestine (ĭn tĕs'tĭn), small, 74; large, 75, 76
Iodine, 231, 234
Iris (ī'rĭs), 90, 92
Iron, 66
Itch, 45
Ivy, poison, 237, 238

Joints, 166
Juices, digestive, 74

Kidneys, 77
Knee, 166

Lacing, tight, 200
Lather, 45
Latin, 11
Laxative (lăk'sa tĭv), 76
Leggings, 240
Legs, 164

Lemonade, 233
Lemons, 70
Lettuce, 67, 70
Lice, 45
Ligament (lĭg'a ment), 166, 208
Light, 95, 97, 98, 100
Lighting, 98
Linen, 195
Lint, 195
Liquids, 152, 153
Liver, 66, 67
Louse, 45
Lungs, 77, 142, 144

Malaria (ma lâr'ĭ a), 26
Manicure, 48
Maple sugar 62, 64
Matches, 227
Meals, 68
Mealtime, 79
Measles, 125, 149
Meat, 60, 62, 65
Medicine, 71, 76, 111, 152
Microscope, 20
Milk, 21, 40, 68, 78, 233; foods in, 60, 64, 65; minerals in, 66, 81; vitamins in, 67; pasteurized, 69, 70; vitamin D in, 71; for colds, 152, 155
Milk sugar, 64
Minerals, 66
Mirror, 94
Moisture, 142, 145
Mosquitoes, 26, 241
Motion pictures, 101, 104
Mouth, 34, 142
Mucus (mū'kus), 126
Muscles, 38, 62, 65, 68; of eye, 90, 92; exercise of, 155, 178; nerves and, 164; rest for, 180

Nails, 42, 47, 204, 208
Nap, 233
Nerves, 36, 164; in eye, 95; of hearing, 121, 122
Noise, 134
Nose, 34, 122, 125, 142
Nostrils, 126
Nurse, school, 47
Nuts, 62

Oak, poison, 237, 238
Oil, 35, 42, 48, 236. *See also* Cod-liver oil *and* Olive oil
Ointments, 111
Olive oil, 6, 12, 47
Orange juice, 81
Orangeade, 233
Oranges, 67, 70
Orangewood stick, 47
Organ, 142
Overshoes, 199
Oxygen (ŏk'sĭ jen), 77, 145

Pain, 36
Pasteur (päs tĕr'), Louis, 18
Patrol, Safety, 220
Peas, 65, 66
Pediculosis (pē dĭk ū lō'sĭs), 45
Pelvis (pĕl'vĭs), 164
Perspiration, 35, 36, 209
Phosphorus (fŏs'fō rus), in milk, 66; and vitamin D, 70
Plato (plā'tō), 4
Play, 41, 79, 178, 197; outdoor, 155, 179
Playground, 26, 225
Pneumonia (nū mō'nĭ a), 148, 157
Poison, 130
Poison ivy, 237
Poison oak, 237
Policeman, traffic, 219
Pores, 34
Posture, 162, 171
Potatoes, 64, 74
Prism (prĭzm), 92

Proteins (prō'tē ĭnz), 65
Prunes, 66
Pupil of eye, 90
Pus (pŭs), 126

Quarantine (kwŏr'an tēn), 149

Radiation (rā dĭ ā'shun), 38
Rain water, 26
Rainbow, 94
Raincoats, 198
Rattlesnake, 239
Raw materials, 60
Reading, 8, 100, 101
Reflections, 94
Repair of body, 65, 77
Rest, 12, 79, 233; for colds, 152, 155
Retina (rĕt'ĭ na), 95
Ribs, 164
Rinsing, dishes, 21; hair, 45
Romans, 8
Rome, 8, 13
Roughage (rŭf'ĭj), 69
Rowboat, 229
Rubber clothing, 199
Rubbers, 156
Rubbish, 22
Ruffs, 199

Safety, on street, 218; habits of, 220; rules for, 221; in play, 222, 225; with fire, 227; on the water, 228; during vacation, 229, 237
Safety Patrol, 220
Salads, 233
Saliva (sa lī'va), 74
Salt, 35, 66
Sand, glare on, 98
Sandals, 203
Scalp, 42
Scarlet fever, 124, 149
School, 4, 6, 23
School dentist, 80
School nurse, 47
Schoolyard, clean, 25
Science, 16; medical, 16
Screens, 23
Seeing, 95
"Seeing eye," 108
Serum, antivenom (sēr'um ăn tĭ vĕn'um), 240
Shampoo, 43
Shank, 208
Sharp objects, 106
Shoes, 22, 25, 178, 202; styles, 203; fitting, 204; new, 206; care of, 209, 210
Shoulders, 166
Shower bath, 12, 40
Sidewalk games, 224
Sitting, 172
Skeleton, 164, 165
Skill, 178
Skim milk, 64
Skin, 34, 36, 39; how fed, 40; inside nose, 142
Skins, 188, 189
Skull, 164
Sleep, 41, 79, 155, 180
Slides, playground, 225, 226
Smell, sense of, 142
Snake-bite outfit, 240
Snakes, 239
Sneezing, 146, 147, 153
Snow, glare on, 98
Soap, 6, 36, 44; soft, 14, 15
Socks, 36, 208
Soda fountain, 241
Soil, 20
Sound, 119, 121
Specialist (spĕsh'al ĭst), 125, 129
Spectacles, 103
Spinach (spĭn'ĭch), 66, 67
Spinal cord, 164
Spine, 164
Spinning, 191

Sponge bath, 12
Starch, 64, 74
Stockings, 36, 156, 208, 209
Stomach, 41, 74, 79
Stomach-ache, 79
Streets, 14, 25, 218
Styles, 199
Sugar, 64, 74
Sunburn, 235
Sunlight, 22, 97, 155, 235
"Sunshine vitamin," 70
Sweat, 35, 39
Sweet potatoes, 67
Swimming, 130, 228
Swings, 225, 226

Table manners, 79
Tan, 41, 235
Tears, 106
Teeters, 225, 226
Teeth, foods for, 66, 81; need vitamins, 67, 69; grind food, 74; care of, 80; second, 80
Temperature, 37, 38, 155
Tendon, 167
Testing eyes, 101
Thermometer, 37
Throat, 122
Throwing things, 106
Toast, 81
Toeing out, 176
Toenails, 42, 204, 208
Toes, 166
Toilet, 76
Tomato juice, 81
Tomatoes, 67, 81
Tone of body, 179
Tonic, 40
Tonsil (tŏn'sĭl), 130, 143
Towel, paper, 154
Traffic, 218
Traffic lights, 218, 222
Trunk, 164
Tuberculosis (tū bĕr kū lō'sĭs), 148
Typhoid (tī'foid) fever, 234

Underclothes, 12, 36, 192, 198, 209
Urine (ū'rĭn), 78

Vacation, 229, 231, 233
Vegetables, 40, 60, 64, 76; raw, 81; protect against colds, 155; cooked, 233
Vinegar, 16, 20
Vitamins (vī'ta mĭnz), 67; A, 68; B, 69; C, 69, 70; D, 70; G, 71
Voice, 119, 122

Walking, 173
Washbowl, 22
Washing fruit, 78
Washing, hands, 20, 76, 79, 154; skin, 35; feet, 36; hair, 43; eyes, 111
Wastes, 75, 76, 77, 145, 180
Water, 15, 26; body needs, 65, 76, 78; for colds, 152; safety on, 228; safe drinking, 235
Water moccasin, 239
Wax in ear, 133, 134
Weaving, 191
Whey (hwā), 64, 65
Whooping cough, 149
Windpipe, 119, 142, 144
Wool, 191
Work, 177, 178
Wraps, 155
Wrist, 166
Writing taught in Greece, 8

X-ray machine, 206

Yeast, 20

Zoo, 239

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